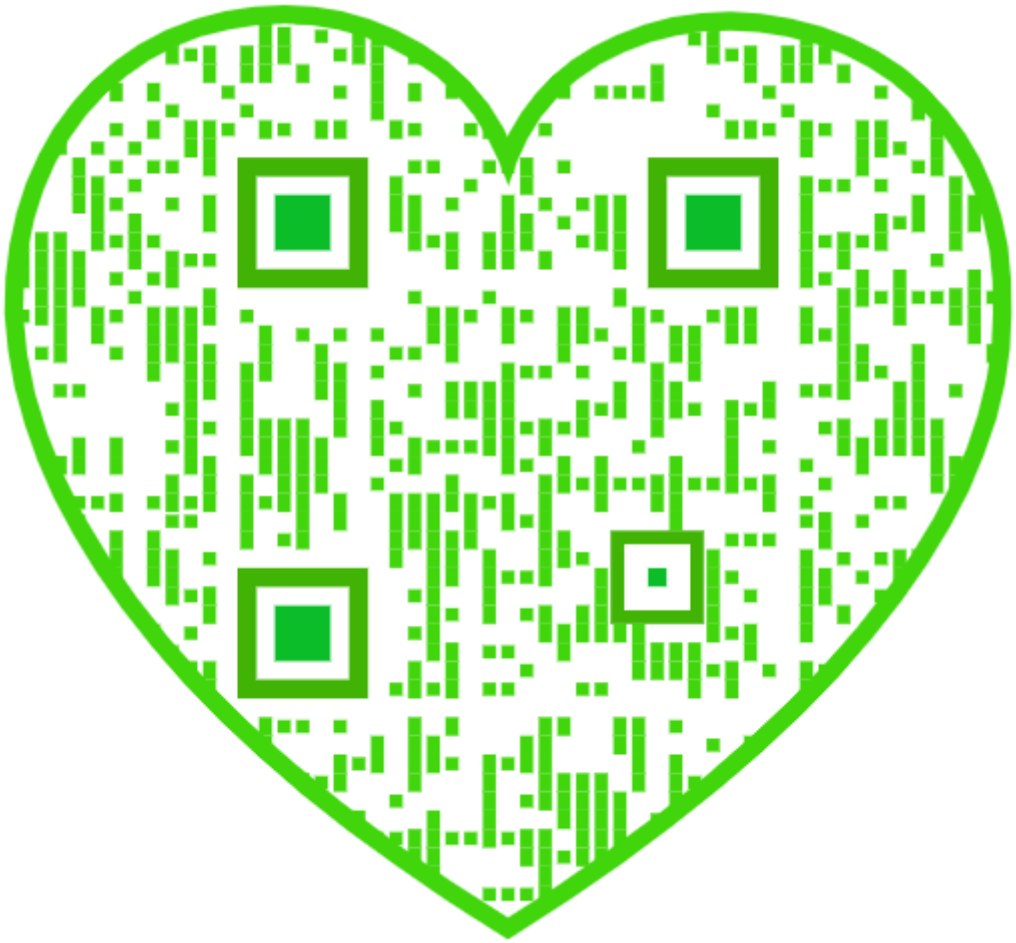

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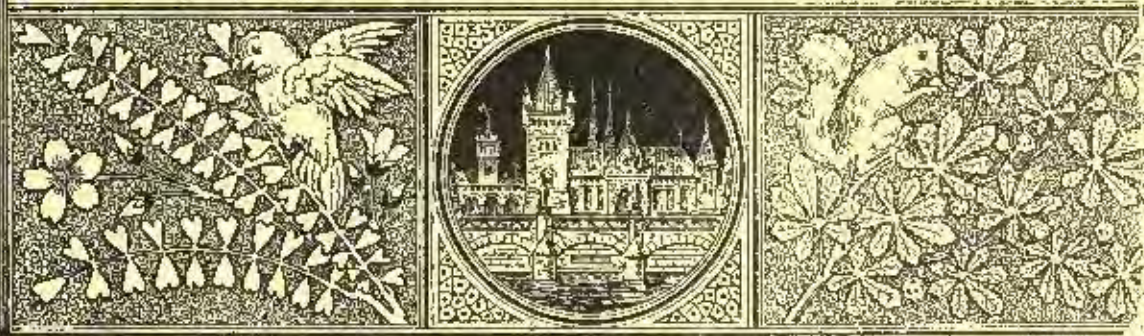

VOLUME XXV

JANUARY-JUNE

1889

TICKNOR & CO. PUBLISHERS.

211 TREMONT ST. BOSTON.

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S. J. Parkhill & Co. Printers
Boston Mass.

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" " House of E. F. Willis. E. F. Willis, Architect, 688

The American Architect and Building News.

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JANUARY 5, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE question of carrying on mason-work in freezing weather has excited a good deal of attention among architects, since the publication of an official report to the British Government by a representative in Copenhagen, from which it appeared that brick walls are laid in that city in winter with perfect success, the only precaution taken being to use freshly-slaked lime in the mortar, so that it may be warm when put on. It is hardly necessary to say that many, if not most, architects doubt seriously the propriety of using under any circumstances mortar made with lime half-slaked, and doubt still more whether the inevitable freezing would be any more advantageous to this sort of mortar than to the ordinary kind. Quite recently interesting contributions to the discussion have been made by architects and engineers in Norway. One of these, Herr Torp, a Government Engineer, had several experimental walls built in 1879, part with materials prepared in the ordinary manner, and part with mortar made with freshly-slaked lime. The work was done in winter, the thermometer varying from six to twelve-and-one-half degrees below zero. We must note, by the way, that the *Deutsche Bauzeitung*, in which we find this interesting account, does not say whether the thermometer used is Fahrenheit or Réaumur or Centigrade, but although there seems to be a fashion in Germany just now of using Réaumur's scale, we may perhaps assume that these are Fahrenheit temperatures. The walls were left for five years exposed to the weather, and were then taken down. Although the best materials had been used, both in the hot and cold mortar, and the bricks had been laid with great care, the walls proved worthless. There was no cohesion between the bricks, and the mortar in all cases was mere powder. On the other hand, Herr Due, an architect of Christiania, who had built experimental walls, both with lime and cement, in very severe frosts, found in the following summer that the frozen walls were quite equal in quality to those laid with similar materials in warm weather. A third expert, Herr Werwing, of Stockholm, reports that in 1881, five experimental piers were built in the city material-yard, with brick in lime mortar. The bricks were thoroughly dried, and the lime was not only freshly slaked, but the sand was piled on iron plates, heated nearly to redness, and in this condition was mixed with the lime. The first pier was built when the thermometer showed four below zero, the second at ten below, the third at fourteen below, and the fourth and fifth at eighteen below. Each pier, when completed, was covered with a small roof, to keep the rain off the top. At present these piers are in tolerably good condition, but the joints of those built at a temperature of ten degrees or more below zero were disintegrated to a considerable depth by the frost soon after their completion. In the winter of 1886–7 a technical society in Stockholm had several experimental piers and walls built in cold weather, but the result was so unfavorable that it was decided that the experiment had not been carried out with sufficient care, and the piers are to be rebuilt. The *Deutsche Bauzeitung* hopes, as will all architects and engineers, that careful and extensive tests may be made, to decide conclusively under what circumstances mason-work, in lime or cement mortar, can be safely carried on in severely cold weather, and we earnestly commend the subject to the attention of students at our schools of scientific architecture. So far, the only points upon which the experimenters seem to be agreed, are that the bricks must be dry, and that the work must be done with great care. These, however, cover only a small portion of the subject. In fact, "great care" is not to be expected of bricklayers at work in a piercing February wind, and what architects and builders want to know is how walls can be safely built, with either lime or cement, with ordinary care during the cold season. To our mind, the idea of warming the mortar by using freshly-slaked lime, or by toasting the sand on hot plates, has something ridiculous about it. The mass of mortar is so small in proportion to that of the bricks, that if the latter were employed at the temperature of the atmosphere in a cold day, the mortar would freeze between them almost instantaneously even if it were at boiling-point when applied. Any one can satisfy himself of this by pouring hot water on a brick pavement on a cold day, and mortar freezes much more readily than clear water. Of course, the mortar under some circumstances, may not be injured by freezing, but this immunity from injury should not be wrongly attributed to the effect of using hot lime in preventing it from freezing. If we might make a suggestion, it would be that some one should experiment in a field hitherto almost untried, by warming the bricks, instead of the mortar. We had, years ago, occasion to lay brickwork in cement in winter, and the bricks were kept hot by piling them over one of the low, flat furnaces used for heating pebbles for making coal-tar concrete. They retained the warmth for a long time, probably long enough for the cement in the inner portions of the wall, at least, to set before freezing, and the work seems to have been perfectly sound; but whether this was a better plan than heating the mortar alone, or how the bricks can be best warmed, or whether the cement under such circumstances would be better with salt or lime in it, are points which trial alone can decide.

TWO have two theatres burned in one night, without any loss of life, is a piece of good fortune which is not likely to occur again very soon. In Oswego, N. Y., the other night, during the performance of one of Mrs. Langtry's plays at the Academy of Music in that city, clouds of smoke were seen to pour up from the hot-air register in the middle-aisle, and the crackling of fire was heard beneath. Naturally, the audience and the actors made a rush for the doors, which was partially checked by what the newspapers call some "cool-headed men," who jumped upon the stage and shouted that there was "no danger." Fortunately, the people in the audience trusted the evidence of their own senses, rather than the representations of the "cool-headed men," and in two minutes the theatre was cleared, just as flames began to come through the floor. The fire, it seems, caught from an overheated furnace in the basement, which, by a judicious effort of planning which we would like to commend to the attention of the next grand jury, was placed under the middle-aisle, near the main entrance, just where it would have cut off the escape of a large part of the audience, if they had listened to the blandishments of the "cool-headed men," and delayed their rush for safety. In Chicago, on the same night, just after the close of a performance at the Chicago Opera House, one of the calcium-lights used for the stage effects fell to the floor, setting fire to the carpet, and in a short time the building was completely burned out. If the accident had happened half an hour earlier, it is impossible to say how many lives might have been lost, but only one or two persons were left in the building, who easily escaped.

WE generally prefer to wait for more definite information before taking up the "charges" which are so liberally hurled at Democratic office-holders by Republican newspapers, and *vice versâ*, and the New York *Tribune*, we regret to say, is not the journal to which we refer with the most im-

plicit confidence for information on topics bearing upon politics; but one of its recent "developments," or "mare's nests," or whatever else our readers may choose to call it, has so much importance to the public and the profession, whether there is any truth in it or not, that we will try to extract a moral from it, without attempting to investigate its probability. According to the Washington correspondent of the *Tribune*, who has just turned his austere Republican eye upon the office of the Democratic supervising architect, a state of affairs has been, or rather, is likely to be found there, which must excite the gravest concern in all lovers of virtue. Among other things, it appears that Colonel Freret, the present supervising architect, has so monstrous a love for Democratic draughtsmen that, after the recent order of the President, placing his office under Civil Service rules, he "summoned his henchmen" and concocted with them an extraordinary scheme for resisting the operation of the order. As soon as draughtsmen were needed for the office, although, under the new rules, it was necessary to select the candidates by competitive examination, the conspirators, to whom, for some unexplained reason, the Civil Service Commissioners appear to have entrusted the preparation of the examination papers, drew up a set of questions "that would turn any would-be applicant gray." Advertisements for candidates were inserted in the newspapers, accompanied with a statement of requirements which was "enough to knock the best architectural draughtsman in the country dizzy," with the purpose of preventing candidates from presenting themselves or passing the examination, so that, in default of material from this source, Colonel Freret would be permitted to appoint his assistants himself. Whether this plan, in the description of which it will be observed that the *Tribune* correspondent keeps up in perfection the style of composition bequeathed by the late Mr. Greeley to his successors, worked well or not we are unable to ascertain, but it appears that, if any candidates presented themselves, none were accepted at the examinations, and only a small amount of imagination is required to infer all the rest from this circumstance.

SOON afterwards, however, another fell plot was conceived in the bosom of the supervising architect, whose "insatiable desire for self-glorification and enrichment" is soon, it appears, to be fed by means which have been revealed to the *Tribune* correspondent, although kept secret from all other persons. The principal point of this scheme, and, it need hardly be said, the one which causes the keenest anguish to good Republicans, is to consist in an effort to have contracts entered into for all public buildings for which an appropriation has been made before the fourth of March, when the present administration goes out of office. As the execution of this heinous purpose requires the coöperation of the principal assistants in the office, they have been seduced by "plums" in the shape of missions to buy sites for the new buildings, and will, we suppose, come back prepared for any iniquity, although, as it is usual to obtain sites for public buildings before proceeding to their erection, and as these gentlemen have been for years entrusted with that duty, we do not at once perceive how Satan should be able to utilize the present opportunity any better than the previous ones. However, we suppose that Colonel Freret, who evidently maintains intimate relations with the powers of evil, will look out for that, and on their return the conspirators will find the plot ready. Omitting the least important of the horrid details which the *Tribune* correspondent gives, the scheme contemplates nothing less than the employment of the office-draughtsmen after hours in making the drawings required for contracting for the new buildings. As there seems to be some objection to doing this directly, the plan is said to be for the supervising architect to employ outside architects to furnish drawings for given buildings, which, by the way, is, we think, often done, with the understanding that they, in their turn, will engage the office-draughtsmen to do for them, as private individuals, out of hours the work which official routine does not allow them to do for the public authority. By this indirect means the persons familiar with the proposed buildings will be enabled to push the drawings far more rapidly than would be the case in the ordinary course, and at the same time, according to the *Tribune* correspondent, there will be "general demoralization of the office, and the establishment of a precedent dangerous and impracticable," besides "utter confusion and the worthless work that must ensue in consequence of its being done in less than one-fifth the time required for good work," followed by the award, "on those drawings bristling with mistakes," of contracts which "cannot be annulled without great cost to the Government," while, "if the buildings are begun, half the work will have to be torn down as worthless." This "startling conspiracy," which, to the ordinary mind, looks exactly like an attempt of a faithful and energetic architect to free himself from the intolerable fetters of official deliberation and routine and try, for once, to get public work done with the same promptness that would be shown in private transactions, is called by the *Tribune* correspondent a "premeditated and determined attempt to violate the law," devised by Colonel Freret to "enrich himself." Abundant proof is asserted to be in the possession of the same correspondent "to send several of the officials of the supervising architect's office to State Prison," and "at least twenty" of these gentlemen are represented as "liable to indictment and punishment by fine and imprisonment, or both," while Congress is called upon to interfere at once, and, in fact, the Senate, as the guardian of Republican interests, has already ordered an investigation into charges which, so far as we can see, are based simply on speculations as to what Colonel Freret's motives could have been in making his examination papers so hard, and sending certain of his clerks to certain places, and on predictions as to what he is likely to do hereafter.

THE moral which decent architects, as well as decent people generally, will draw from all this is that, under present conditions, appointment to a post of professional responsibility under the United States Government is a disgrace and degradation to be avoided at all hazards. So long as *Tribune* and *World* correspondents and their like are allowed, under the excuse of political zeal, to lay hold of the simplest acts of an official, garnish them with false constructions and interpolations invented on the spot, and exhibit their victim, day after day, as a fit subject for the criminal courts, just so long will the public be served mainly by persons with no reputation to lose. We have always believed the supervising architect's office to have been originally a device for exercising an extensive political influence under cover of doing work which, as has been amply demonstrated, would be much better and more cheaply done by employing local architects. The excellent character of the heads of the office has done much to deprive it of its usefulness as a political machine, and the scandals which disgraced it during the early days of its existence would be impossible under the well-trained professional men who have of late years conducted it, but, with its disposition and opportunity to exert political influence, its only reason for existence disappears. The uniform testimony of those who should know best, the incumbents of the office, is that it is a slow and cumbrous device for producing poor work at an enormous expense, and that it exposes the Government to fraud on the part of contractors by allowing the architect no discretion in dealing with them, while the endless defamation poured upon those who hold what the *Tribune* correspondent calls its "fat berths" by those who would like to get into them themselves brings Government employment into contempt among self-respecting members of the profession.

THERE is a homely adage about the bird that fouls its own nest which has a close application to this matter of competitions conducted under improper conditions, and, if architects as a body, who, if we understand an article in this month's issue of the *Century*, are looked on by the public as a cross between the vampire and the turkey buzzard, are not interested in the cleanliness of their own nest, they have themselves to blame if the public continue to proffer them offal for their subsistence. The protest against the manner of conducting the competition for the enlargement of the Massachusetts State-House is put in such a form as to have application to any similar invitation, and the greater the number of protestants — from all parts of the country — the more respectful consideration it will receive, the more valuable precedent will it establish, and the greater step forward toward the desired better condition of things will have been taken. We will remind the younger men who may be disposed to regard such affairs as their "chance," that when they are a few years older they will look upon the matter from a different standpoint, and will then regret that they did not make an effort to help abolish the evil.

BUILDERS' HARDWARE.[1] — XVI.

SHUTTER FASTS AND LOCKS.

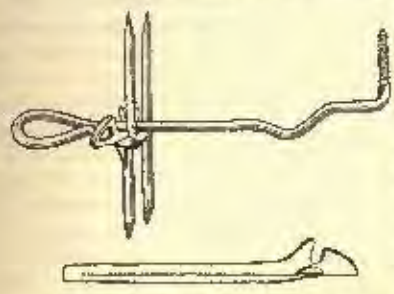


Fig. 235. Spring Wire Blind-fast.

THE appliances for securing outside blinds, though in some cases combined directly or indirectly with the blind hinges, are more often distinct fixtures, acting independently of the blind attachments. The usage in regard to shutter fasts and locks varies in different portions of the country. In the West there seems to be a willingness to accept considerable complication in the devices, whereas the standard Eastern goods are mostly very simple; though, of course, this distinction is not a rigid one, by any means. The West, however, is rapidly developing new ideas and fresh combinations, in hardware no less than in nearly every other department of mechanical industry, and special patent forms seem to be more naturally expected there than elsewhere. This does not imply that the Eastern cities are united in the usage of particular forms, for places as near to each other as New York, Providence and Boston employ different forms, as will be seen later on.

Figure 235 will serve to illustrate one of the most common forms of shutter or blind fast, consisting of a tempered steel rod, or wire, one end of which is cut with a thread and screws into the under side of the blind, while the other end is held by a staple. The rod is bent so that the loop is kept away from the blind, and the elasticity of the metal enables it to spring

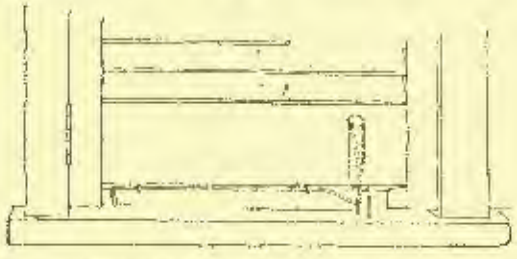


Fig. 236. Folsom's Blind-fast. J. R. Hiller.

into the malleable-iron catch on the sill, or on the outside of the wall. The well-known "Stedd" blind fastener is practically the same as this, except that the rod is bent in a complete twist to gain the elasticity, and a common screw takes the place of the threaded end. The same form is made, with slight variations, by several of the leading manufacturers.

Figure 236 shows the only form of wire blind-fast which allows one to close the blind without leaning out of the window, or in any way lifting the shutter to release it from the back catch. It consists of a steel wire, bent as shown by the figure, but carried as far back towards the hinge as the hanging-style of the blind will permit. To release the blind, the fastener is simply pulled inward. Any form of back catch may be used. For the sill-catch a wide staple is used, which is set on an angle to the blind, so as to force the spring back and permit it to catch behind the staple. This fastener has but very recently been put on the market.

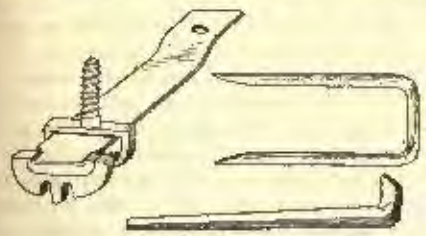


Fig. 237. Boston Pattern Blind-fast. Stanley Works.

The blind-fast shown by Figure 238 works entirely by gravity. It consists of a bent lever, working in a mortise cut through the bottom rail of the blind, pivoted so that one arm protrudes above the top of the rail, while the other catches over an ordinary hook on the sill or against the wall. Lugs on the end of the horizontal lever arm catch on a thin plate screwed to the under side of the rail and prevent the fast from dropping too low or being lifted too high. This fast is made of coppered malleable-iron, and seems like a very satisfactory article.

Figure 237 is an older style of blind-fast, on essentially the same principle as Figure 236; using, however, a flat bar instead of the spring wire. This form requires a little more work in adjustment. It is designated peculiarly as the "Boston" pattern blind-fast. The so-called "New York" pattern is illustrated by Figure 239. The action of this fast will be better appreciated when it is remembered that in New York, the blinds are usually hung flush with the outer casing, and the sill is rebated so that the bottom of the blind strikes against the upper rebate. The latch is hinged on the inner plate, the weight of the long arm keeping the inner hook thrown up. The sill-staple is driven perpendicularly, while the back catch is screwed horizontally into the wall. The Stanley Works also has what is designated as the "Providence" style of blind-fast. This is

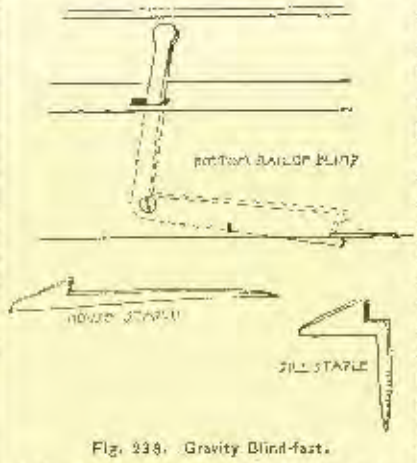


Fig. 238. Gravity Blind-fast.

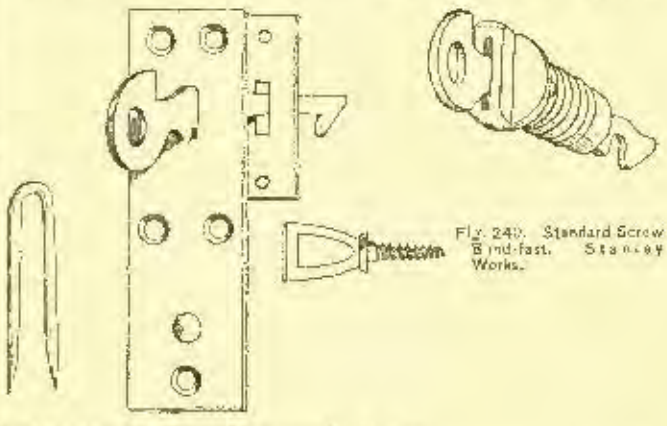


Fig. 239. New York Pattern Blind-fast. Stanley Works.

Fig. 240. Standard Screw Blind-fast. Stanley Works.

exactly the same as the "New York" pattern, except that the inner hook catches over instead of under the sill-staple, and is shaped like the back catch of Figure 235, inverted.

Figure 240 shows a form of blind-fast which is screwed bodily through the blind, catching on sill and wall staples in the same manner as the preceding styles. A flat spring inside of the case keeps the inner hook constantly pressed up and against the sill-staple. A variation of this same pattern is made which acts by gravity, the catch working in an oblique slot in such a manner that the weight of the outer catch forces the inner catch always against the sill-staple.

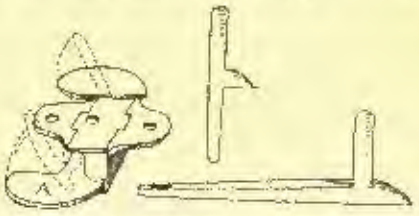


Fig. 241. Security Blind-fast. Stanley Works.

Figures 241 and 242 illustrate two forms of fasts which are screwed to the under side of the blind. The former acts

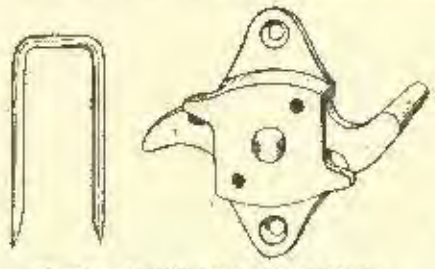


Fig. 242. Lock Blind-fast. Stanley Works.

Fig. 243. Turn-buckle A. G. Newman.

entirely by gravity. The lobes, *A A*, are connected through the case, and are counterbalanced so as to always drop to the

[1] Continued from page 276, No. 677.

position shown. When the blind is closed, the lobe strikes against the sill-pin and is forced up as shown by the dotted lines, dropping so as to catch inside of the pin. Figure 242 has a concealed spring, to force the action of the lever.

The foregoing styles of blind-fasts are intended to be used on wooden buildings, but with some modifications in the sizes might also serve for brick buildings. In New York, it is customary to use some form of turn-buckle, Figure 243, which is driven into the joints of the brickwork, the cross-piece being free to turn, but hanging naturally in a vertical position by reason of the greater weight of the longer arm. Turn-buckles of a slightly different shape are sometimes used, also, for wooden buildings.

All of the foregoing are, in a certain sense, automatic; that is to say, the blind, if flung open or shut will stay in position, requiring no special adjustment. Figure 244 is a form of drop-

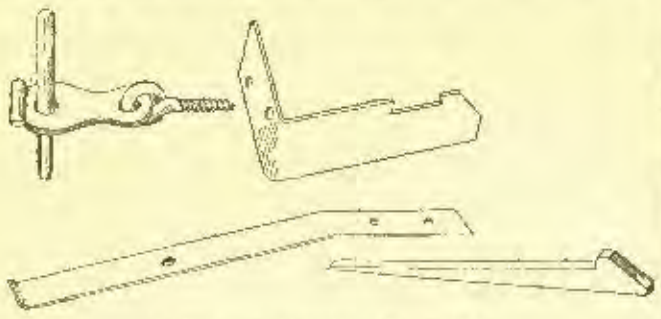


Fig. 244. Drop-and-Pin-fast. Stanley Works.

and-pin fast, much used in some cases, consisting simply of a plate secured to the blind by a screw-eye, perforated with a hole to fit over the pin driven into the sill. For holding the blind open, a back catch is made as shown by the figure, which locks with a plain, flat spring, screwed to the under side of the blind. The figure also shows the form of back catch used for brick buildings.

Figures 245 and 246 show two very simple forms of blind-catch serving only to keep the blind closed, and generally

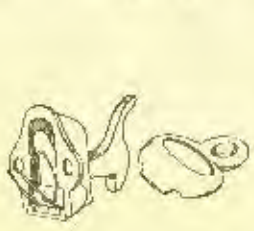


Fig. 245. Seymour's Blind-catch. P. & F. Corbin.

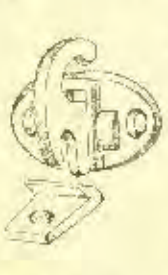


Fig. 246. Blind-catch. Shepard Hardware Co.

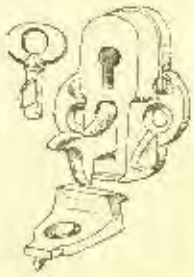


Fig. 247. Seymour's Blind-catch and lock. P. & F. Corbin.

used with some form of turn-buckle to hold the blind open. Figure 245 works with the aid of a small spring, as shown; Figure 246 works entirely by gravity. There are several varieties of each of these forms in the market. The catch shown by Figure 247 acts in the same manner as Figure 245, but has, in addition, a locking-lever, operated by a key, which secures the catch so that the blind cannot be opened.

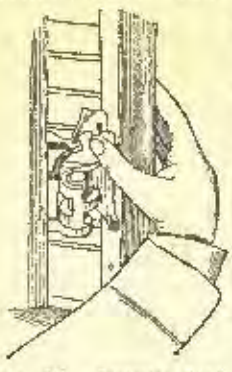


Fig. 248. Rochester Blind-hinge. Sym, Stewart & Baker.

There are a number of forms of blind-hinges, which have been previously described in the chapter on hinges, that in a measure serve as blind-fasteners, keeping the blind either open or shut. They are all perfectly simple in their operations, and it is difficult to discriminate between them. The common fault with them all is in the difficulty of opening and closing the blind. With most of the forms of patent self-locking blind-hinge, the blind must be raised from its seat in order to be swung around. With the blind-fasts previously described in this chapter, it is necessary to lean far out of the window to release the catch from underneath. Figure 248 shows a device intended to overcome the difficulties of both styles. It consists simply of a lever attached to the blind, and hooking into a plate screwed onto the jamb of the window. It is only necessary to lift the end of the lever in order to swing the

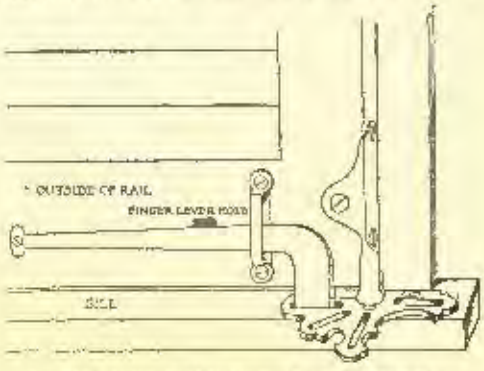


Fig. 249. Tenon Blind-fastener. Tenon Fastener Co.

blind shut. The advantages are that in closing, no lifting of the blind is necessary; there is no danger of throwing it off the hinges, and no chance of pinching the fingers or bumping the head.

There are several other devices intended to hold the blind, either shut or open. Figure 249 illustrates the "Tenon" blind-fastener, which consists of a bent, flat bar, attached to the outside of the blind and catching in slots cut in a plate which is secured to the sill, so that the blind can be held either open or shut, or in either of two intermediate positions. The bar is lifted by means of a lever on the inside of the blind. This fixture does away with the ordinary bottom hinge, substituting therefor a pivot working in the locking sill-plate. A blind-fastener of this description is especially suita-

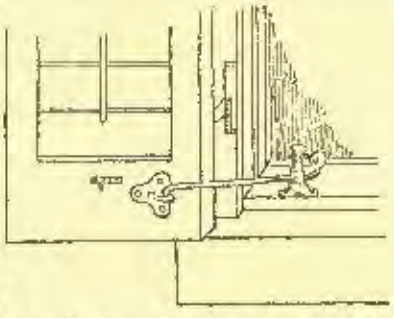


Fig. 250. Expansion Blind-adjuster. Russell & Erwin.

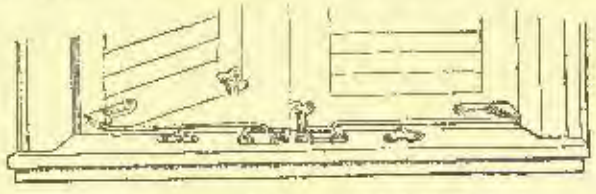


Fig. 251. Washburn's Blind-adjuster. B. D. Washburn.

ble for bay-windows, or any place where the blinds cannot open clear back. Being placed on the outside of the blind exposes it to the weather to an undesirable degree, though it is made of Bower-Barffed iron to prevent it from rusting.

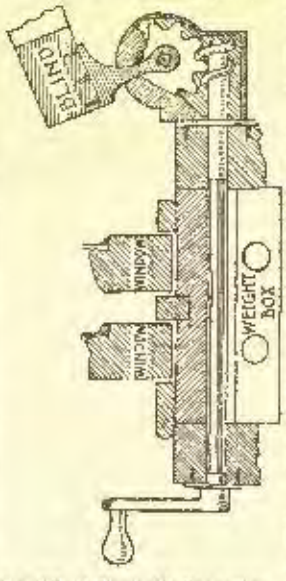


Fig. 252. Mallory's Shutter-worker. Frank B. Mallory.

Figure 250 is a very simple form of bar blind-adjuster, the bar being attached to the blind, and held in position by the action of the thumb-screw on the jamb; Figure 251 shows a variation of the same principle, consisting of a bar which fits into the sockets at several points on the sill, enabling the blind to be held in several different positions. The action of the adjuster will readily be understood by the figure. Zimmerman's Blind-fast is on practically the same principle as this.

The difficulty with the two foregoing patterns is, that they do not hold the blind perfectly rigid, and the rods are likely to get in the way, specially as the rods and sockets take up considerable space on the sill. There is but little practical advantage in having a fixture which permits of the blind being open at various degrees, for

as a rule, most people prefer to have their blinds either entirely open or entirely shut.

The desire to open and operate blinds without opening the window has led to the invention of several devices which are worked by rods passing entirely through the frame of the house and attached to the blind. It is not altogether easy to understand why such devices are used so little, but it must be admitted that all of those now in the market are more or less clumsy. Still, the idea is an excellent one, and if there were greater demand for such appliances, undoubtedly better ones would be put before the public. The shutter-worker of this description that is the most natural in its adjustment is illustrated by Figure 252. This consists simply of a rod, at the

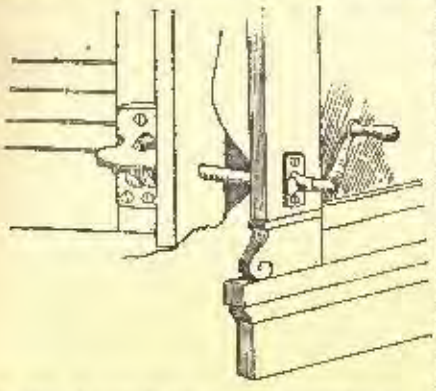


Fig. 253. Brown's Shutter-worker. Ireland Mfg. Co.

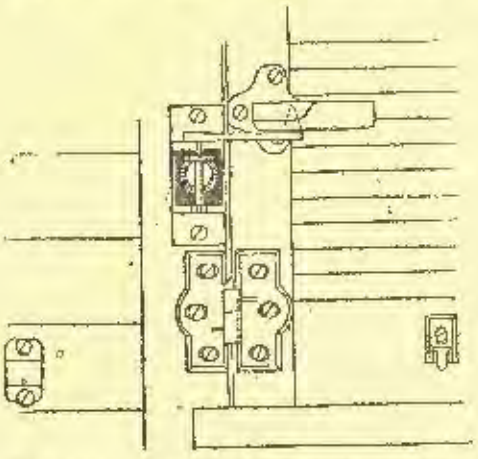


Fig. 254. Automatic Shutter-worker. Dudley Shutter Worker Co.

end of which is a thread working against a cog-wheel forming a part of the bottom hinge of the blind. On account of the slowness of pitch of the thread, it is very difficult to move the blind from the outside, but the leverage is sufficiently strong to enable one to easily open the blind from within by turning the crank.

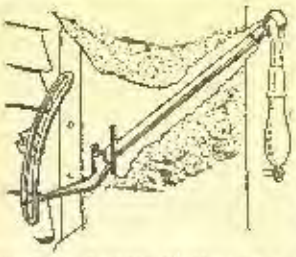


Fig. 255. Brockton Shutter-worker. Tyler Mfg. Co.

A very similar appliance to this is the Brown shutter-worker, Figure 253, in which the thread on the spindle works into teeth on the bottom of a plate forming a part of the lower shutter hinge.

The Automatic Shutter-worker, Figure 254, combines the good points of several other devices, and is somewhat more complicated than either of the preceding. Two cog-wheels gear into each other. The shaft of one wheel is carried through the wall and can be operated by a crank or handle inside the house. The shaft of the other wheel turns a crank, or bent lever, the end of which works in a slide attached to the face of the blind. The cog-wheels are encased in an iron box, which is shown partly removed in the figure, in order to illustrate the workings. Aside from the number of parts, which is no very great objection, this shutter-worker has a great deal to recommend it. It is strong and compact, and can act on the shutter with such force that, it is asserted, a child can work the blind with it in a high wind. It has the advantage of permitting the blind to be removed without disturbing the fixtures.

One of the simplest acting shutter-workers, is illustrated by Figure 255. This is very ingenious in its idea, consisting of a straight rod set on an angle, with a bent lever on the end working in a curved slot or catch secured to the outer face of the blind. This shutter-worker will lock the blind as securely as any door can be locked, the handle of the rod being dropped down onto the pin as shown by the lock.

The company which manufactures the Brockton shutter-worker has bought up the patents of the Prescott shutter-worker, which was somewhat on the same principle. There are a few other shapes in the market; but practically a very few, which embody ideas essentially different from those described.

AWNING-HINGES.

Awning-hinges might more properly be considered with common blind-hinges, but they are included in this connection, as they are in a measure blind-adjusters, permitting the blind to be opened part way. The writer has been able to find only two forms in the market. The simplest is shown

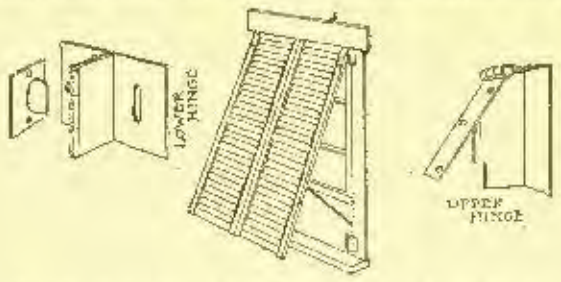


Fig. 256. Tucker Awning Blind-hinge. Hamelin & Russell Mfg. Co.

by Figure 256. This consists of a double-acting hinge for the upper portion of the blind, a lower hinge being screwed to the jamb and fastened to the blind only by a turn-button.

The other form of awning-fixture is more commonly used

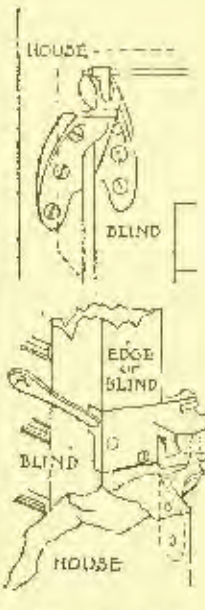


Fig. 257. Automatic Blind-awning Fixtures. F. C. North & Co.

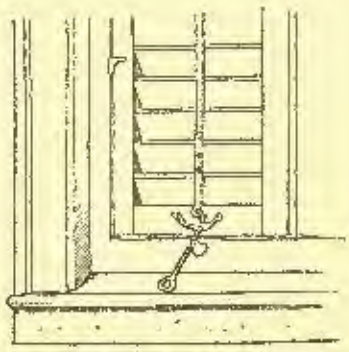


Fig. 258. Byam's Blind-slat Adjuster. Byam, Stewart & Baker.

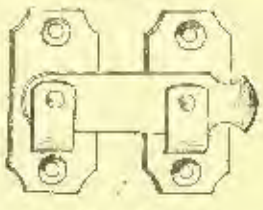


Fig. 259. Shutter-bar.

about Boston, Figure 257. The upper hinge is so made as to work in either direction, while the lower hinge consists of a cup fitting over a pin screwed to the jamb. A small catch, *A*, keeps the blind from pushing out when the hinges are to be used in the ordinary manner, but is readily lifted when the blinds are to be pushed out from the bottom. The fixtures are

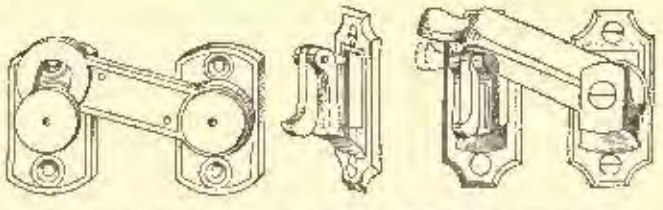


Fig. 260. Shutter-bar. Fig. 261. Morris's Self-locking Shutter-bar. Ireland Mfg. Co.

sold with side-bars to hold the bottom of the blind away from the building, and with a centre cross-bar which permits the blinds to be opened part way in the ordinary manner, and secured. The description and the figure might seem to imply

a somewhat complicated arrangement, though the fixtures work very simply, and seldom fail to give satisfaction.

Figure 258 shows a form of slat-adjuster intended to be operated by a key from the inside of the house without opening the window. The slats are connected with an eccentric which is turned by the key, so that the slats can be either raised or lowered as desired.

HARDWARE FOR INSIDE SHUTTERS.

There is little to be said as regards fasts or locks for inside shutters. The shutters themselves are usually provided with knobs of some description, with porcelain or metal heads secured in position by a screw. The shutters are also provided with some form of latch or bar, of which Figure 259 is a very simple type. Figure 260 shows a more elaborate form, for inside work. There are, of course, many variations of these forms. A few of the hardware manufacturers have been making self-locking shutter-bars, in which the cross-bar is secured by some form of auxilliary lever or cam. Figure 261 illustrates one variety. There is, however, but little demand for such appliances.

For sliding shutters a bar like that shown by Figure 260 may be employed. There are also several varieties of mortise hooks, Figure 262, which work with a spring, and are rather preferable for most cases.

The retail prices of the foregoing blind and shutter fixtures are as follows:

TABLE OF SHUTTER-FIXTURES.—PRICES PER WINDOW, WITH TWO SINGLE-FOLD BLINDS.

Fig.	Name.	Price.
235	Stanley's wire blind-fast	$ .07
236	Folsom's shutter-fastener	.08
237	Boston pattern blind-fast	.08
238	New York pattern blind-fast	.08
240	Standard screw blind-fast	.09
241	Security blind fast	.09
242	Lock blind-fast	.06
243	Turn-buckles or drop-buttons for brick	.10½
	Turn-buckles or drop-buttons for wood	.08½
244	Drop-and-pin-fast	.08
245	Seymour's blind catch	.12½
246	Shepard blind-fast	.04
247	Seymour's blind catch and lock	.21
248	Rochester blind-hinge	.17
249	Tenon blind-fastener	.15
250	Excelsior blind-adjuster, galvanized	.56
251	Washburn's blind-adjuster,[1] galvanized, 10-inch bar	.50
252	Mallory's shutter-worker, with hinges and handle	1.25
253	Brown's shutter-worker, japanned	.85
254	Automatic shutter-worker, with hinges and handle	.75
255	Brockton shutter-worker	.50
256	Tucker swing blind hinges[1]	.87
257	Automatic blind swaing fixtures[1]	.75
258	Dyas's blind slat-adjuster	.25
259	Shutter-bars—bronzed-iron, 2-inch, per dozen	.84
260	Shutter-bars, bronze, 2-inch, per dozen	1.35
261	Morris's self-locking shutter-bar, bronzed-iron, 2-inch, per dozen	.80
	Morris's self-locking shutter-bar, bronze, 2-inch, per dozen	3.00
262	Sliding shutter-hook, bronze, each	.75

[1] For wooden boxes.

TRANSOM AND SKY-LIGHT FITTINGS.

Transoms are hung by common butts at the top or bottom, or are pivoted in the centre horizontally. The ordinary hinges used for transoms are such as might be used for any purpose. These have been previously discussed. Sash centres or pivots are commonly mortised into the frame and into the sash. Figure 263 is the ordinary form. Figure 264 is another variety in which both pivots are exactly alike. This is secured in place by first fastening the round part of the pivot at entire end of the sash, and securing one socket-piece to the sash-frame. The other socket is then fitted to the opposite pivot, and the sash placed in position and turned at right

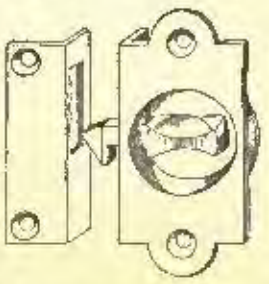


Fig. 262. Sliding Shutter-hook. P. & F. Corbin.

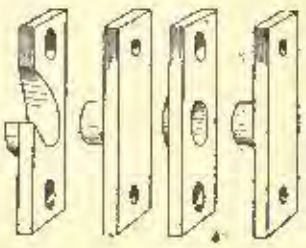


Fig. 263. Sash-centres or Transom-hinges.

angles, thus uncovering the second socket, so that it can be screwed to the jamb. This form is claimed to be tighter and consequently more secure against draughts than the ordinary style.

Instead of either of the foregoing, it is sometimes desirable

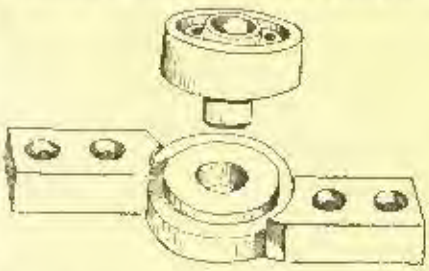


Fig. 264. Sash-pivot. A. G. Newman.

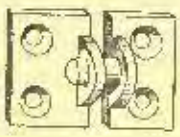


Fig. 265. Surface Sash-centre. P. & F. Corbin.

to use pivots which do not turn on the line of the centre of the sash. Figure 265 illustrates a form which can be used in such

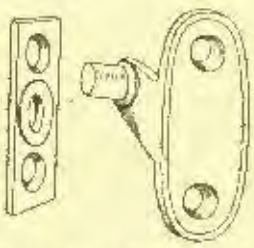


Fig. 266. Surface Sash-centre. J. F. Wolfensak.

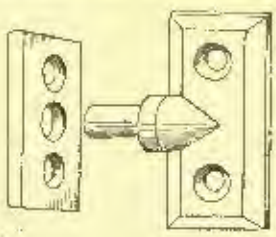


Fig. 267. Transom-pivot. Hopkins & Dickinson Mfg. Co.

a case, both pivot and socket being planted on the faces of the sash and the frame. Figure 266 and Figure 267 are other varieties sometimes met with. The different uses for which

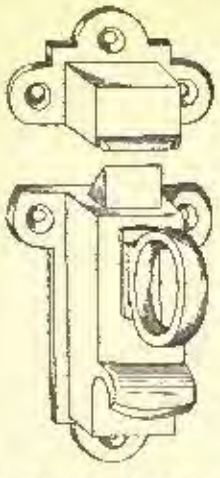


Fig. 268. Transom-catch. A. G. Newman.

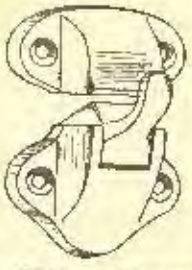


Fig. 269. Cupboard and Transom Catch. Ireland Mfg. Co.

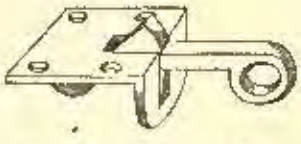
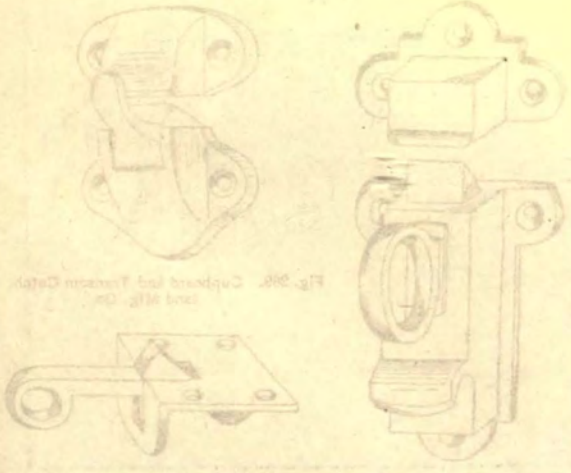


Fig. 270. Transom-catch. J. B. Shannon & Sons.

these various forms are applicable will readily be appreciated; the first being for a case in which the jambs and the sash are flush; the second, one in which the transom sets out from the jamb; and the third, one in which the jamb is too deep, or the



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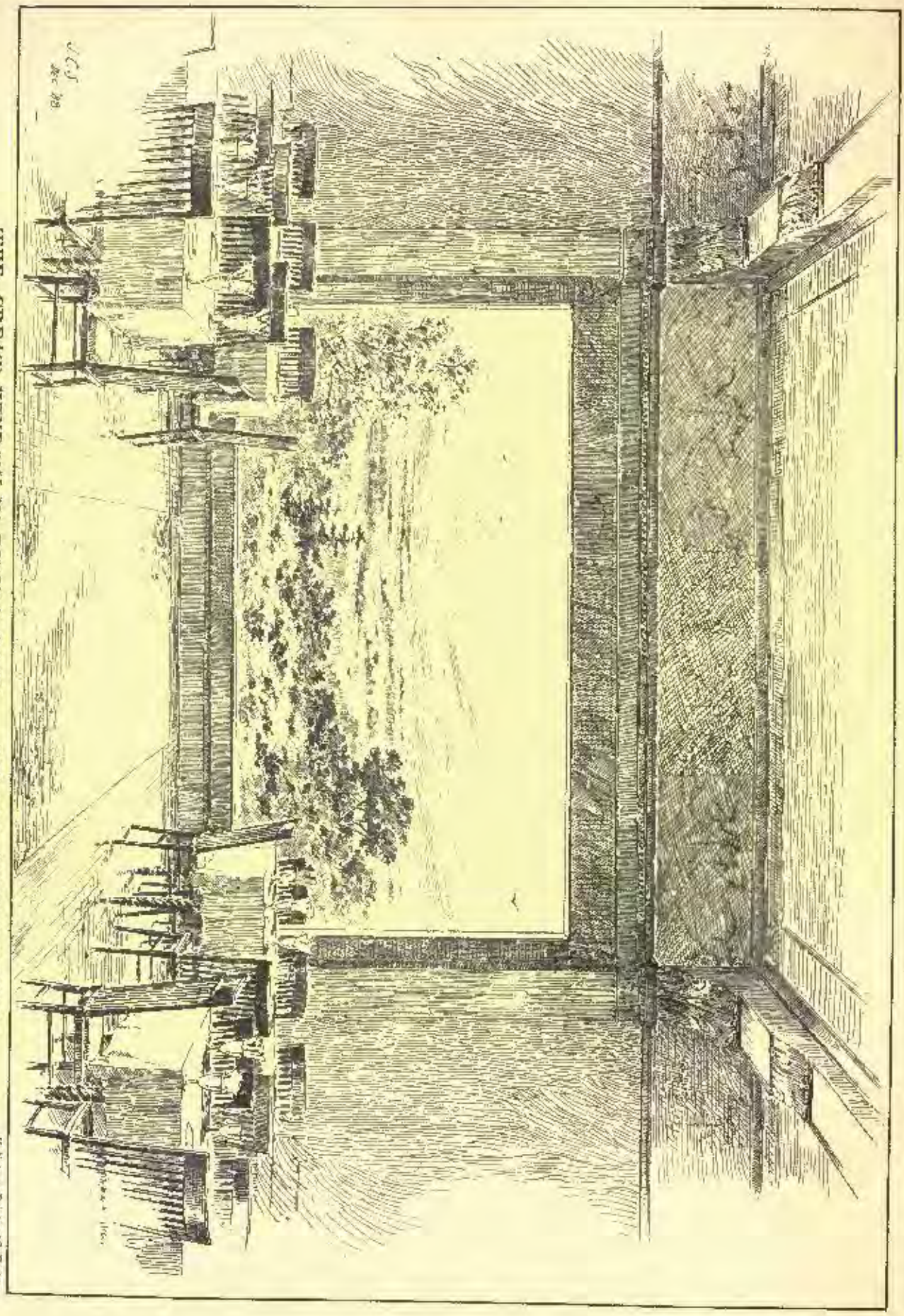

THE GREAT WINDOW IN DINING ROOM — POLAND SPRING HOUSE.

JOHN CALVIN STEVENS — ALBERT WINDOW COBB, Archts.

Heliotype Printing Co. Boston.

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"The Brua Memorial Chapel."

Pennsylvania College, Gettysburg, Pa.

J. A. Dempwolf, Archt.

York, Pa.

Heliotype Printing Co. Boston.

R. C. Spencer Jr. Del. '88

: HOUSE at WOOD'S HOLL :
for
Mr. M. Ogden Jones.
Wheelwright & Haven, Arch'ts,
: Boston, Mass. :

Heliotype Printing Co. Boston.

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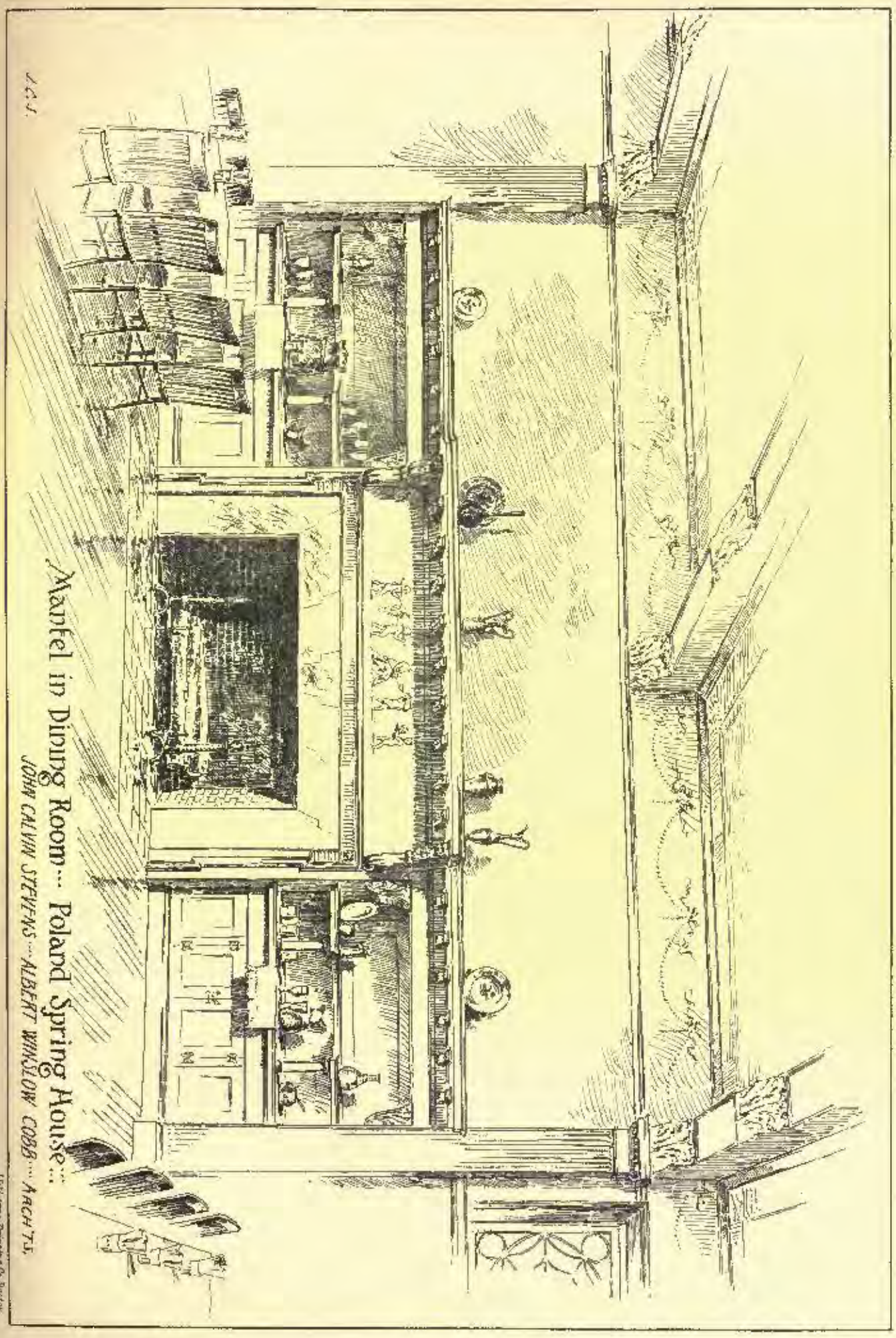


Mantel in Dining Room — Poland Spring House.

JOHN CALVIN STEVENS AND ALBERT WINSLOW COBB, ARCHTS.

Heliotype Printing Co. Boston.

transom set too far in to permit of the hinges being applied to the face of the jamb.

Transoms are usually provided with some form of spring catch to hold them closed. Figure 268 is a direct catch, the

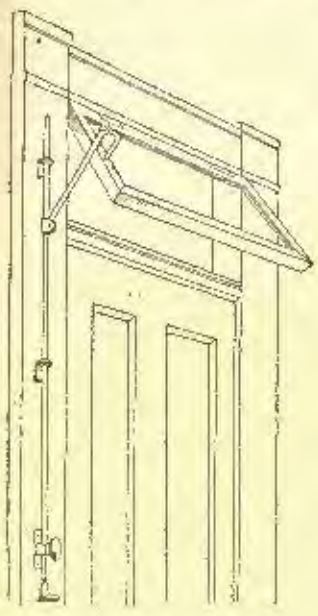


Fig. 271. Transom-lift. J. F. Wollensak.

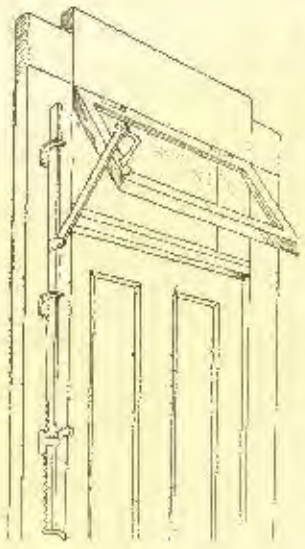


Fig. 272. American Transom-lift. American Mfg. Co.

latch being secured to the transom. This is for use when the jamb and the sash are flush. Figure 269 is a transom-catch worked on a little different principle from the foregoing. The same form is also used for cupboards. This, as well as the first, is fastened onto the face of the transom. Figure 270 shows a transom-catch intended to be mortised into the edge of the transom, either at the top or the bottom.

In the best work it is customary to provide some appliance for lifting the transom and holding it in position. With the

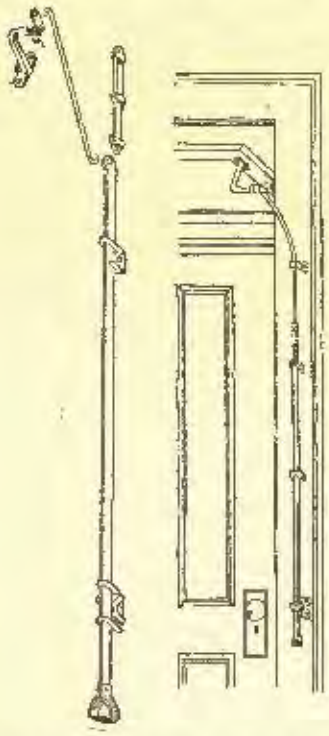


Fig. 273. Steller Transom-lifter. Russell & Erwin.

Fig. 274. Overall's Transom-lifter. P. & F. Corbin.

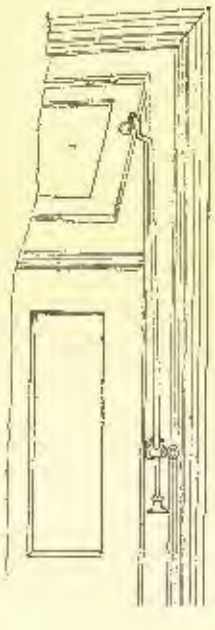


Fig. 275. Excelsior Transom-lifter. Russell & Erwin.

ordinary catches previously described, a chain is attached at one side of the transom, permitting it to be opened down from the top a certain distance only; but it is much more convenient to have some appliance that will permit the transom to be opened in either direction, and will hold it securely. The most popular, and one of the best known is the Wollensak transom-lifter, Figure 271. This consists of a straight rod with a hinged arm attached to it, the arm being secured to the edge of the transom, while the rod works up and down in a series of rings, being held at any given height by turning a button at the bottom binding on the rod. These are made for transoms either pivoted at the centre and swinging down, or pivoted and swinging up, or hinged at either top or bottom. Figure 272 shows another form, made by the American Manufacturing Company. The rod in this case is replaced by a flat bar, the attachment otherwise being essentially the same as in the previous example. The bar is notched at the bottom on the inner edge, and a catch on the lower guide-ring locks the bar at any height. Figure 273 is another form manufactured by Russell & Erwin. In this case the bar is held in position by turning the button at the bottom. This transom is provided with a supplementary set of guides at the top, so that in shoving up the bar there will be no opportunity for the weight of the transom to deflect it sidewise. Figure 274 shows a form of transom-lifter manufactured by P. & F. Corbin, consisting of a straight rod, with a long, flexible steel attachment at the top. The rod is secured at any height by a turn-button in the same manner as in the first example, while the flexibility of the upper portion of the rod permits the transom to turn at any angle. There is yet another form, Figure 275. This consists of a single rod attached directly to the transom, and secured on the jamb only by a single turn-button, near the bottom. This turn-button is placed at an angle in such a manner as to allow considerable side-play on the rod, and so permit of the deflection necessary for opening the transom.

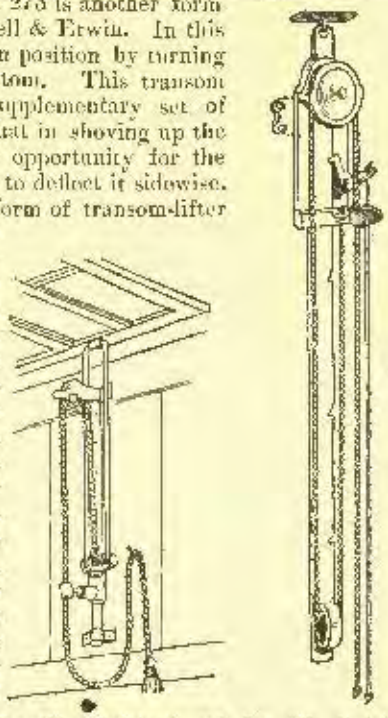


Fig. 276. Skylight-lift and Lock. J. F. Wollensak.

Fig. 277. Skylight-lift. S. L. Hill.

TABLE OF TRANSOM-FITTINGS.

Fig.		
263	Sash-centres, japanned, per dozen pairs	$ .62
	Sash-centres, brass, per pair	.62
264	Sash-pivots, 1¼-inch brass or bronze, per set	2.00
	Sash-pivots, bronzed-iron, per set	1.60
265	Surface sash-centres, P. & F. Corbin, brass, per set	4.00
266	Surface sash-centres, Wollensak, bronze No. 4, per set	1.00
	Surface sash-centres, Wollensak, bronzed-iron, per set	.17
267	Surface sash-centres, Hopkins & Dickinson, bronze, per set	.98
268	Transom-catch, per dozen	15.00
269	Transom and cupboard catch, bronze, per dozen	7.60
	Transom and cupboard catch, bronzed-iron, per dozen	.50
270	Transom-catch, bronze, per dozen	5.00
271	Wollensak's transom-lifter, bronzed	1.20
	Wollensak's transom-lifter, nickel-plated	2.50
272	American transom-lifter, coppered	1.10
	American transom-lifter, nickel-plated	3.15
273	Steller's transom-lifter, bronzed-iron	.35
	Steller's transom-lifter, bronze	2.60
274	Overell's transom-lifter, bronzed	.60
275	Excelsior transom-lifter, bronzed	.65
276	Wollensak's skylight-lifter, No. 12, each	2.00
277	Hill's skylight-lifter, each	1.50

Prices for transom-lifters are for a medium 4-foot rod and for a single fixture.

Closely allied to the transom-lifters are those which are used for skylights. Figure 276 shows a form manufactured by Wollensak. This consists of a double bar attached to a socket working on a slotted bar. The socket has attached to it a spring-catch which slips into the slots on the bar. The rope passes through the socket up over a pulley, and down through an eye in the end of the spring-catch. By pulling the bar out away from the socket, the spring-catch is released and the socket, and with it the skylight may be lifted or lowered, the spring-catch shutting back when the horizontal strain on the rope is relaxed. This is made in two sizes, with a length of eighteen inches each. Figure 277 shows another form of skylight-lifter in which a ratchet on the side of the upper framework fits into slots on the edge of the lifting-rod, the ratchet being worked by a separate cord. The ratchet is fitted with a spring to keep it in position.

The preceding table gives the retail prices of the goods described in this chapter.

(To be continued.)

THE ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

STATE MILITARY ACADEMY, ALBANY, N. Y.

(Gelatine Print, issued only with the Imperial Edition.)

HOUSE OF M. OGDEN JONES, ESQ., WOODS HOLL, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.

DINING-ROOM WINDOW, POLAND SPRINGS HOTEL. MESSRS. STEVENS & COBB, ARCHITECTS, PORTLAND, ME.

DINING-ROOM FIREPLACE, POLAND SPRINGS HOTEL. MESSRS. STEVENS & COBB, ARCHITECTS, PORTLAND, ME.

BRUA MEMORIAL CHAPEL, PENNSYLVANIA COLLEGE, GETTYSBURG, PA. MR. J. A. DEMPWOLF, ARCHITECT, YORK, PA.

DETAILS OF SLOW-BURNING CONSTRUCTION, FLORENCE FLATS, MINNEAPOLIS, MINN. MR. JAMES C. PLANT, ARCHITECT, MINNEAPOLIS, MINN.

PROTEST AGAINST THE COMPETITION FOR THE MASSACHUSETTS STATE-HOUSE.

BOSTON, MASS., December 10, 1888.

THE Commonwealth of Massachusetts has, by its Commissioners, advertised for designs for the State-House extension, said designs to be furnished in open competition. The conditions of the competition, as announced, have evidently been framed without due regard to the best custom in the conduct of such matters, the sole end and aim of which should be to secure to the State the best service by making sure that "the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected; and that the author of the successful design shall be employed as architect, provided the building is built and he is competent."

The conditions announced are faulty —

First. In that they are not drawn up in accordance with the best custom, and no assurance is given that an expert adviser will be employed to aid the Commission in their choice.

Second. That no assurance is given that the successful competitor will be employed, but, on the contrary, it is distinctly stated that all premiated competitors are to relinquish all ownership in their plans to the State, without any further claim to compensation or employment.

Third. Even if the first prize in the competition were as it should be, the execution of the building, the actual prizes offered would still be entirely insufficient compensation to the authors of the drawings placed second and third.

For the above reasons, we, the undersigned architects, citizens of the State of Massachusetts [and elsewhere], protest against this form of competition, which, in our opinion, is not for the best interests of the State or of our profession, and we therefore decline to enter it:

BOSTON, MASS.
Cabot, Everett & Mead.
Wheelwright & Haven.
Joseph B. Richards.
John A. Fox.
Geo. M. Young.
H. A. P. Newenndh.
Longfellow, Alden & Harlow.
Edwin J. Lewis.
Andrews & James.
H. Langford Warren.
Walker & Bosh.
Wm. Robb Ware.
Hartwell & Richardson.
Cummings & Sears.
T. M. Clark.
Allen & Kenway.
Rand & Taylor.
Thos. O'Grady, Jr.
Sturgis & Cabot.
Shepley, Rutan & Coolidge.
Robb & Tilden.
Snell & Gregerson.
Shaw & Hunnewell.
Wm. G. Preston.
L. Weissheim.
Frank E. Zerrahn.
Carl Fehmer.
Arthur Little.
Peabody & Stearns.
Winslow & Wetherell.

BOSTON, MASS.
W. H. McGinty.
W. M. Bacon.
W. P. Richards.
Daniel Appleton.
H. M. Stephenson.
W. R. Emerson.
Wm. Whitney Lewis.
J. Merrill Brown.
Chamberlin & Whidden.
Wm. D. Austin.
F. W. Chandler.

BOLTON, MASS.
F. A. Ellsworth.
H. Walther.
Jos. A. Clough.
Geo. P. B. Alderman.
Cain & Kilburn.
Henry H. Gridley.
W. E. Fitch, C. E.
D. H. & A. B. Tower.
T. W. Mann.

LAWRENCE, MASS.
Chas. T. Emerson.

LYNN, MASS.
Wheeler & Northend.
Gall & Varney.
H. W. Rogers.

LOWELL, MASS.
F. W. Stickney.
Merrill & Cutler.

SPRINGFIELD, MASS.
Gardner, Pynn & Gardner.
Richmond & Seabury.
Mason Perkins.
F. S. Newman.
J. M. Currier.

WORCESTER, MASS.
Stephen C. Earl.
E. Boyden & Son.
Fuller & Delano.
A. P. Cutting.
J. D. Wentworth.

BALTIMORE, MD.
T. B. Gheguier.
R. F. J. Johnson.

BIRMINGHAM, CONN.
Alderman & Lee.

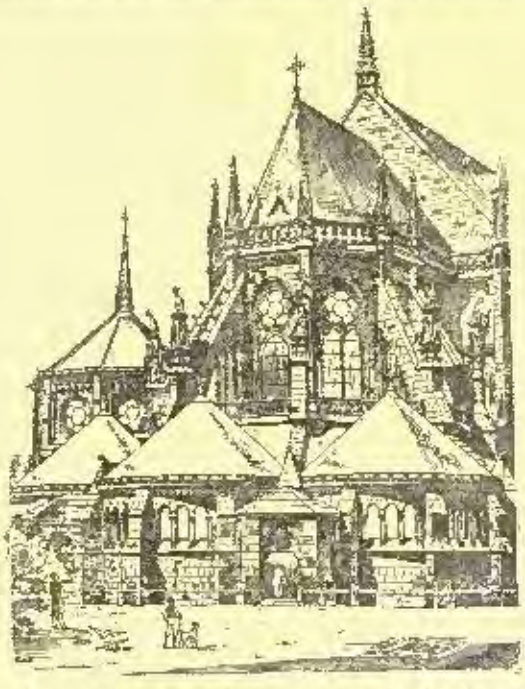
BRIDGEPORT, CONN.
C. T. Beardsley, Jr.

NEW YORK, N. Y.
W. B. Bigelow.
Fowler & Hough.

PHILADELPHIA, PA.
Smith & Pritchett.

SAYVILLE, N. Y.
L. H. Green, Jr.

ARCHÆOLOGICAL CAMPING IN ARIZONA.—I.



Choir of St. Peter's, Leipsic, from Architektonische Rundschau.

THE writer has elsewhere given an account of the work of the Hemenway Southwestern Archæological Expedition in Arizona, under the direction of Mr. Frank Hamilton Cushing: its purposes, its composition, and the results reached in the first fifteen months of its operations.[1] Some details about the country, pictures of life in camp, and the methods of exploration pursued — rambling though they be — will probably help the many who are interested in the important prehistoric story of our continent to gain a clearer conception of the character of the researches.

First, then, a glance at the country: The scene of operations has chiefly been in the neighborhood of the flourishing young towns of Phœnix and Tempe, in the valley of the Rio Salado, now usually called the Salt River by the American inhabitants. I prefer, however, to keep to the more euphonious Spanish name. To the northward and eastward the mountains rise grandly in compact ranges, the main peaks having about the same relative height, as seen from the plain, as Mount Washington when viewed from the Saco Valley at Conway, in New Hampshire. Out of this mountain-wall the Salado breaks from a wild cañon, whose neighborhood was the scene of some fierce and momentous struggles between the gallant troops of General Crook and the wild Apaches fifteen years ago or more, at the time when that splendid soldier gave the country its first relief from their incursions; a peace which would probably have remained unbroken to this day had it not been for the wicked

[1] "*The Old New World.*" An Illustrated letter from Camp Hemenway, Arizona, in the *Boston Herald* of April 15, 1888. Reprinted in pamphlet form by the *Salem Press*.

mismanagement of the Indian Department, under the control of corrupt rings.

Not far from its exit into the plain the Salado is joined by the Rio Verde near a huge ruddy rock, that looks like a Cyclopean fortress, called Mount McDowell. The military post, Fort McDowell, is near its base. A few miles below Phœnix the Salado joins the Gila, the former being really the main stream above their confluence, although the latter gives its name to the river in its further course down into the grand Colorado. From the southeastward around to the northwest the mountains rise in detached groups, with the land sloping away evenly and gradually from their feet in a way that may, perhaps, be best illustrated by imagining a great carpet with heaps of sharp stones placed here and there beneath it, and their ragged tops appearing above the sagging surfaces they have torn through.

It is a semi-tropical region, the latitude being that of Southern California, and the altitude in the neighborhood of a thousand feet. The winters are delightful in temperature; a fiercer summer heat is hardly to be found in North America: dry and oven-like, at times rising to something like 130 degrees, but, on account of its dryness, it is not so oppressive as a temperature of 90 degrees in the humid air of the Eastern States. The vegetation is the monotonous growth of the desert sage-brush, greasewood, forests of stunted mesquite, and clumps of ironwood and palo verde near the mountains, cottonwoods along the river, and many varieties of fantastic-looking cactus almost everywhere on the plains. But where the land has been brought under irrigation a new and luxuriant growth appears: fertile fields of grain and pasturage, vineyards, orchards of peaches and apricots, and already, in spots, date-palms, fan-palms, orange-trees, oleanders, and cypress are imparting a new aspect to the landscape.

It is in the early afternoon of January 11 when I step from the train of the Maricopa & Phœnix Railroad — a branch from the Southern Pacific — onto the platform of the new brick station at Tempe, at present the only regular stopping-place on the line between Maricopa Junction, about twenty miles away, and Phœnix, the terminus, nine miles further on. I am greeted by Mr. Frank Hodge, the stalwart young private secretary of Mr. Cushing. We proceed to Camp Hemenway in a buckboard drawn by two stout mules. The weather seems to be a strange commingling of early summer and late autumn. The sky is serenely blue, the air is quiet, and the sun shines with a warm, southern friendliness. But the ground is brown and the trees are bare, though some sparse yellow leaves still cling to the alamos, or cottonwoods, here and there.

The town has enjoyed a "boom" from the building of the railway, and its evidences are seen in many new buildings; the railway has made the great timber-supply of California and Oregon available, and, frame-construction being a novelty here, its attainability has given it a proportionate desirability in the eyes of the inhabitants. Wooden buildings are, however, totally unsuited to this hot and dry climate, and the folly of substituting them for the thick-walled and comfortable adobe structures, so despised as "mud-houses" by the average settler, must soon be made manifest by experience. It is possible to make an adobe building architecturally attractive, though, as commonly constructed by the American or the somewhat Americanized Mexican, they are about as ugly as they can possibly be made, with their bare walls contrasting with the bony whiteness of painted door and window-frames, and the inconvenient sliding sashes set even with the wall-surface, thus giving no shadows or depth to the openings. Houses with such windows have a vulgar impertinence of expression. The conservative traits of ordinary humanity are shown in hardly anything more than in their methods of construction, and the presumedly wide-awake and progressive American will cling to the customs of his predecessors with all the tenacity of the most primitive races, though he has no other ground than that his fathers did so before him, and, therefore, it must be good, reasoning no more about it until experience in a changed environment slowly teaches him more convenient ways. The unintelligent savage builds like his fathers because his fathers were taught to build like the gods, and, therefore, those ways are sacred, and must not be changed. The northern origin of the American population that is filling up this region is shown by its adoption of details of construction totally unsuited to the climate, who reason, of course, that that is the way things are done in a "white man's country," and, therefore, must necessarily be superior to the ways in which Mexicans do things. So they go on stilling and sweltering all through the long, hot summer days in their boxy little houses, survivals of the habits brought from regions where timber is plenty and the climate fickle.

Considering these things, I have thought I should like to settle down in a place like this long enough to set an example of how it is possible to live comfortably with pleasant surroundings by adapting the ordinary materials to modern means and taste. For instance: a one-story, wide-spreading house of thick adobe walls, with large, high, airy rooms, and casement-windows opening to the floor, giving the full benefit of the air-space; above the flat roof, supported on posts or thick adobe piers, with a space of eight to ten feet between, a second roof of corrugated tile, such as is used so extensively in Spain and Spanish America, sloping gently, and with wide eaves. This would answer the purpose of a double-roof, the shaded air-space keeping the rooms below cool, and would also give a second story, open to the air. In the summer this open story would be used for sleeping purposes, divided by screens in the Japanese fashion to give privacy, if need be, and with musquitoes, flies, and other insects kept out by wire-netting surrounding the whole. People in this region find it impossible to sleep in their houses in the summer now: they take to the open air with their mattresses, either on the roofs or on the ground outside. By this means, however, they would have all the advantages of open air combined with shelter, for drenching rains come up in the night-time not infrequently. Care would be taken, in such a house, to leave no interstices for the concealment of tarantulas, scorpions, centipedes, and other things of the kind. An agreeable exterior would be given by coating the walls with cement, colored with some pleasant-hued paint or wash so common in Mexico and other Spanish countries. A beautiful feature could be introduced in the shape of a large central hall, running up to the second roof, with a handsome staircase to a gallery communicating with the open space on either side. Instead of the hand-made adobe, a much cheaper and better material might be obtained by making the blocks in an ordinary brick-machine, like common bricks, thus saving the very considerable expense of burning them, while the pressure used in making them would give them a compactness, assuring a lasting quality far greater than that of the common adobe. I have seen an unburnt, machine-made brick that has been kept for years without crumbling, as hard as when first turned out. I wonder something of the sort has not been adopted in countries like this, where the dry, frostless climate renders burning the brick for ordinary uses really superfluous. Like many other most useful and simple things, the idea has probably never occurred to makers.

Several rocky hills rise abruptly around the town, the main portion of which lies at the base of one of them. Here, as elsewhere throughout the West, the French term "*butte*" is applied to such isolated hills, although here one might expect to find the Spanish "*cerro*" fully domesticated. It is in all probability a lingual acquisition from the French trappers and *voyageurs*, handed along from the time when the French were in possession of the Mississippi Valley, and incorporated into the vernacular of the plains by the Missourians, who are the pioneers in all the trans-Missouri migratory movements. The Missourians have the reputation of being a nomadic, semi-vagrant people, and might be called the gypsies of the Western World. Possibly this trait may be due to an absorption of considerable of the French half-breed blood by much of the Missouri population, inoculating it with the same roving impulse that characterizes the French-Canadians. The word *butte* appears to be one of the few things in the vernacular of the plains — which has become that of the entire far West — taken from the French, Spanish being the the most fruitful foreign source, due chiefly to the influence of the Texan vaquero, of which "cow-boy" is a literal translation. The reception of the word through immediate racial contact is proved by its pronunciation throughout the West, *byute* — as near the French u as Anglo-Saxon lips could be expected to approach. Had it been a literary acquisition, the pronunciation of *but* would have been given the word, for we invariably strive to phoneticize — a tendency which, with our unspeakable orthography and ill-formulated phonetic rules, has thoroughly distorted our English tongue. Thus the plainsman talks of the States of *Coloraydo* and *Nevaydo*; but, hearing the name of the celebrated Ute chief spoken as it is in the Spanish dialect of the Mexican peasantry, he calls him Colorow, which is really nearer to the proper pronunciation of the State.

The rapidity and luxuriance of vegetable growth in a region like this encourages the use of ornamental plants, shrubs and trees; the streets are well shaded, and dwellings are usually surrounded by pleasant gardens. The formally located roads are all straight and rectangular in their intersections, running due north and south, east and west, as throughout the West, following the "section-lines," the surveys of the National Land Department cutting the country up into sections of a mile square. So the roads are a mile apart, and, in going between any places not lying in the direction of the cardinal points, one has to travel along two sides of a triangle, necessitating much superfluous travel and consequent expenditure of time. This does not speak well for the American "practicality" of which we are accustomed to boast, especially when we are so used to regard time and money as equivalents. This difficulty might have been avoided, and the distance saved, by providing for a second system of roads traversing the sections from corner to corner, making the quarter-sections triangular in shape. All portions of the country would thus be within convenient reach of each other.

Where the land has not been taken up and brought under cultivation, of course the roads are free to run across country at random, and in an open country like this it is easily done, for the making of a road involves no more than to drive along the same path until tracks are made; but as soon as the land is occupied the roads must confine themselves to section-lines, so that in a journey between two places that lie, say, twenty miles apart from northeast to southeast one would have to travel nearly thirty miles. This, to be sure, is not so serious as it would be were it not for the railways, the great modern highways, which, when a country becomes so well settled as to necessitate the rectangular system of roads, are certain to cover it with their network, and, as they are subject only to the limitations of the most convenient grades, they take the straightest possible course between two points. It would probably be hardly practicable at this late day to adopt such a system of roads in our country, but, as there is a tendency to lay out new towns in a way to provide amply for future growth, it ought to be possible to plan them so as to give streets between the corners of the squares as well. It seems strange that our rushing Western communities, where people are so

intent upon making the most of their time, should not from the start have avoided one of the greatest wastes of time and exertion to which the planning of their towns subjects them.

Our road takes us first to the eastward. Facing us are the Superstition Mountains, their name another mistranslation from the Spanish: Sierra de la Encantacion is the original designation, suggestive of sacrificial caves and weird rites held there by the Indians, as they undoubtedly were. It is, however, a matter for congratulation that the English name is not of the average commonplaceness, but also, like the Spanish, has a mystic significance. The Superstitions have a broad, cliff-like frontage, rising abruptly from the plain, with high banks of steeply sloping detritus at their feet. Their tops are mesa-like, though broken, and on their faces are plainly traced the strata-lines that indicate their geological history. Their forms are suggestive of some grand primitive architecture; castle-like towers and pinnacles stand out from the ruddy mass in the bright sunlight of the afternoon; in the clear atmosphere the mountains seem close at hand, but they are a day's journey distant by wagon! A prominent landmark to the northward of the Superstitions, rising just over the gap of the Salado cañon, is the great mountain mass of the Cuatro Picos, the Four Peaks — four clustered summits, beautiful in the Alpine purity of their winter snow-mantle that seems flung over them like some graceful drapery. A similar garb is worn by the Sunflower Peaks, still further northward, and by others of the mountain wall that extends in compact ranges across the northern horizon, ending in the lofty Bradshaws off beyond Phœnix in the northwest. Beyond and above the Superstitions, to the eastward, rise the Pinal Mountains, and, then, to the southeastward, the detached masses of the high Santa Catalinas, near Tucson, with the Tortolitas and the Pinachos intervening, and the Zacaton near at hand; southwesterly, just across the Gila, is the abrupt wall of the Estrellas frowning in the shadow, and close at hand are the humbler Maricopas. These mountains are nearly all full of mineral treasures awaiting some lucky prospector to reveal them; several rich mines are being worked, and in the Pinal Mountains is the famous Silver King mine, one of the great silver-producers of the world.

Now and then we pass, by the road, traces of ancient ruins, in the shape of low mounds of earth that the ordinary observer takes for natural irregularities of the surface. Tempe is partly built on the site of one of the ancient cities, and the Mexican quarter, locally known as "Sonora," in token of the neighboring Mexican State whence nearly all the inhabitants immigrated, covers long rows of these mounds. Beyond, we pass a house of one of the well-to-do American residents, built on the summit of a large mound formed by the crumbled walls of a ruined temple, which have been nicely graded and terraced, and planted with shrubs and fruit-trees. At first thought it seems a pity that the sites should be so occupied, but there are in the open more than can at present be explored, and, in reality, the ruins thus covered are reserved for the future explorer whom science may send; effectively guarded against the burrowings of relic-hunters — those pests of the archæologist who simply destroy, confuse and disturb for the sake of what are to them but mere "curiosities."

The irrigating canals, or *acequias*, are marked features of the landscape. They give the soil its fertility and are again converting these valleys into luxuriant gardens. The night-frosts of January are just strong enough to check the growth of most things, but the fields of barley and wheat are mantled with the tender verdure of the infant blades, and the darker alfalfa covers expansive pastures with its velvety garb. The land spreads away in floor-like evenness to the feet of the mountains on all sides, towards which it rises in a gradual incline, the direction of which would be almost imperceptible did not the purling water in the ditches tell the tale. Where the canals or ditches have been established a few years, long lines of trees mark their course and give beauty to the landscape. These trees are mostly cottonwoods, which, under the stimulus of plenty of water, attain a height of fifty feet or so in a comparatively short time. They are usually planted along the water-ways, their shade and their shelter from the dry winds preventing evaporation. Where not planted, they spring up themselves in the course of a few years from seeds scattered by the wind, or borne by the water to the banks. The settlers are beginning to plant other varieties than the cottonwood, which will make better timber; among them the catalpa, which grows as rapidly and makes a handsome tree, particularly beautiful in flowering time.

The main canals cut across country regardless of section-lines, following the course that enables them to irrigate the most land, but the supply-ditches, for the most part, keep along the margins of the fields, and the lines of trees that mark their course relieve the monotony of the level expanses, making hollow squares of the farms.

Our mules, though stolid enough in aspect, show that experience has not been an unheeded teacher. Tough are their hides, but their feet are small and delicate, and they have a horror of mud as of the evil one. At a harmless-looking wet place on the road, they shy in alarm. Well they may, for this peculiar soil, stable as it is under ordinary conditions, is converted into something like quicksand when water flows upon it for the first time. In such a place a mule-team will suddenly sink almost to the ears, and the animals will be likely to smother unless speedily rescued, floundering about without a foothold, and with every movement sinking deeper and deeper. After such a mud-bath, a mule is a sight to behold, with skin and harness thoroughly plastered. A new ditch, into which the water has flowed for the first time, seems to present but a slight obstacle to travel, but it is something to be dreaded by the traveller, and hardly any amount of persuasion can induce a mule to venture across it. A well-travelled road, however, gets compacted so that water has no effect on it, or after water has flowed over a piece of ground for two or three successive times, something in the soil seems to be so affected as to give it stability. A mule has keen discernment and seems able to tell such a place from freshly-flowed land, for it will fearlessly enter upon a part of the regular road where water stands, perhaps from the overflow of a broken ditch, or will, unhesitatingly, cross an acequia or a stream at a regular ford. The liabilities to these mishaps, in a country where new land is being extensively brought under cultivation, gives an element of adventure to drives around the valley.

A half-mile to the eastward, two miles southward, another mile eastward, and then we turn southward again, following an irregular road across country after passing the great Tempe Canal. As we proceed, the country has become more open, for the trees have not yet had time to grow up on the newly-cleared land. The irregular road is, for the most part, through the original wilderness growth of the desert — which is not destined to remain so for many weeks more. A drive of nearly ten miles from town brings us through a low mesquite wood, and we emerge with the white tents of Camp Hemenway before us half a mile to the westward. The place has a pleasant look in the midst of a cleared plain, the military-appearing cluster gleaming in the light of the setting sun against the dark background of the Maricopa and Estrella Mountains.

Our drive ends in the space enclosed by the various tents like a parade-ground; the ladies, Mrs. Cushing and her sister, Miss Magill, advance to welcome their guest and receive the daily mail, and a handsome Mexican youth steps forward to take care of the team. Mr. Cushing is still out at the excavations, but in a few minutes he comes galloping into camp on his beautiful horse, "Douglass," and his eyes shine with happiness at meeting his old friend.

It is dark when the violent clattering of a cow-bell summons us to the kitchen tent to supper. All our little community, with the exception of the laborers, who wait for the "second call," are gathered around the board, and the presence of the ladies imparts an ameliorating influence rare in camp-life. There are the two anthropological members of the staff, Dr. Herman F. C. ten Kate and Dr. Jacob L. Wortman. Dr. ten Kate I have known and esteemed for nearly two years, and in Dr. Wortman I am delighted to find a man whose quiet, unassuming ways do not obscure the recognition of the remarkable scientific attainments of which I have heard from mutual friends in Washington. Dr. Wortman is the comparative anatomist for the Army Medical Museum, at Washington, and has been temporarily detailed to look after the preservation of the valuable ancient skeletons excavated here. Doctor Washington Matthews, also surgeon in the Army, and at present Curator of the Museum, himself a distinguished ethnologist, was ordered to this place by the Secretary of War, last summer, owing to the critical condition of Mr. Cushing's health. Dr. Matthews, who is an old friend of Mr. Cushing's, having been surgeon at Fort Wingate when Mr. Cushing was making his important investigations at Zuñi near by, was so impressed with the scientific value of the ancient skeletons uncarthed here, that his representations induced Dr. J. S. Billings, the Director of the Museum, to enter into an arrangement whereby the Museum should secure duplicate series of the skeletons in consideration of attending to their preservation and classification. The result was the detail of Dr. Wortman for this purpose, a young man already known as the foremost comparative anatomist in the country, and one of the ablest of osteologists and palæontologists.

Sylvester Baxter.

(To be continued.)

SOCIETIES

CHICAGO CHAPTER AMERICAN INSTITUTE OF ARCHITECTS.

THE regular annual meeting of the Chicago Chapter A. I. A., was held at Kinsleys, Thursday evening, December 13, 1888. After dinner the reports of various officers and committees were received. The officers elected for the ensuing year were, President, W. L. B. Jenney; Vice-President, W. W. Clay; Treasurer, S. S. Beman; Secretary, W. A. Otis.

WESTERN ASSOCIATION OF ARCHITECTS. — COMMITTEES APPOINTED FOR 1889.

Committee on the Metric System. — Normand S. Patton, Chairman, Chicago, Ill.; G. W. Kramer, Akron, Ohio; E. T. Mix, Milwaukee, Wis.

Committee on Uniform Contracts and Specifications. — S. A. Treat, Chairman, Chicago, Ill.; J. F. Alexander, La Fayette, Ind.; W. R. Forbush, Cincinnati, Ohio.

Committee on Consolidation of Architectural Societies of America. — D. Adler, Chairman, Chicago, Ill.; George B. Ferry, Milwaukee, Wis.; W. W. Carlin, Buffalo, N. Y.; A. Van Brunt, Kansas City, Mo.; John W. Root, Chicago, Ill.

Committee on a Code of Ethics for Professional Practice. — L. H. Sullivan, Chicago, Ill.

Committee on Bill governing Office of Supervising Architect, U. S. Treasury Department. — D. Adler, Chairman, Chicago, Ill.; D. H. Burnham, Chicago, Ill.; J. F. Alexander, La Fayette, Ind.

Committee on Statutory Revision. — D. Adler, Chairman, Chicago, Ill.; George B. Ferry, Milwaukee, Wis.; J. F. Alexander, La Fayette, Ind.

Committee to Organize State Associations. — J. F. Alexander, Chairman, La Fayette, Ind.; S. A. Preston, Los Angeles, Cal.; A. P. Cutting, Worcester, Mass.; A. C. Dallas, Salt Lake City, Utah; E. W. Wells, Wheeling, W. Va.; T. H. Morgan, Atlanta, Ga.

Committee on Statistics of Competitions. — C. E. Illsley, Chairman, St. Louis, Mo.; J. W. Yost, Columbus, Ohio; A. Van Brunt, Kansas City, Mo.; S. M. Randolph, Chicago, Ill.; J. H. Pierce, Elmira, N. Y.

Committee to Collect Legal Decisions Relating to Building Interests. — Charles C. Hellmers, St. Louis, Mo.

COMMUNICATIONS.

THE ARCHITECTURAL COURSE AT COLUMBIA COLLEGE.

BOSTON, MASS., December 29, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In your reply to Mr. Kimball in the *American Architect* of December 29, 1888, you convey the impression in regard to the comparative "progressiveness" etc., of the trustees or managers of different schools of architecture which is not quite justified, so far as the Massachusetts Institute of Technology, the principal rival of the Columbia College School, is concerned. During my seven years' experience in the Institute of Technology, whatever may have been the faults of the Architectural Department, they were certainly not due to any lack of intelligent interest, and desire to promote the welfare of the Department, on the part of the officers of the Corporation. In the efforts of the Corporation to accomplish the utmost possible good with the limited funds at their command, the Architectural Department was never forgotten or neglected, and it is hardly fair to compare their prudent and far-seeing management of the whole school of which the Department formed a part, with the enthusiastic zeal of the wealthy private gentleman at whose expense the Columbia Architectural School was founded and maintained, and who could be called upon with confidence for almost unlimited contributions for the good of his admirable scheme.

Very truly yours, T. M. CLARK.

[ALTHOUGH our statement was positive, and not comparative, it is possible we may have been unlucky enough to be understood in the latter sense by others than Mr. Clark. — EDS. AMERICAN ARCHITECT.]

SLOW-BURNING CONSTRUCTION.

MINNEAPOLIS, MINN., December 17, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — I am prompted to send you sketches of a cheap construction which I have used, by the letter you published from Mr. Atkinson in one of your October issues. No. 1 is from an apartment-house of my own, where I felt at liberty to experiment, and in some respects I consider it a success. The outside walls have common brick outside, bonded through the wall every six courses; the backing is of hollow bricks, 4" x 6" x 12", of which I should not care to build piers, but which I have tested with actual weights, and consider them strong enough for ordinary four-story brick walls. This wall receives the plaster without lath or furrings, *and is dry.* The extra expense of this wall is met by the saving in furrings and laths.

The partitions are all made of 2" x 4" studding, run into "sheathing-lath" on two sides, as shown by No. 3, with a groove in each edge. These are set flat-ways and spiked — toe-nailed — every two feet on each side, so that the spikes are only 1' 0" apart. As there are no tongues or splines, it is very necessary to thoroughly secure these studs against the danger of springing by each other and cracking the plaster. These partitions have sills and plates of similar 2 x 4's on edge, so it will be seen that the grooves between each upright are connected with a similar groove top and bottom. Thus it is hoped to get enough circulation to prevent dry-rot. For openings, 2" x 3" studs are set, as shown in No. 4, which serve as a ground for plaster and a firm nailing for door-frames and finish.

Where partitions run with the joists, the joists are trebled below, making a solid barrier against fire.

These partitions I have made 12' 0" high, without cross-bracing, and, after plastering, they prove stiff enough for general use. I have never used them for carrying the weight above.

The ceilings are covered with 1" x 4" sheathing-lath, as shown on No. 1, and, where possible, the laths are put on before the partitions below are set. On top of this are 3" of mortar: one part lime, two parts sand, three parts coarse saw-dust. This, when set and dry, makes a light, porous substance, weighing about 50 pounds to the cubic foot. It should be worked stiff, and allowed some time to dry and set before the ceiling below is plastered; otherwise yellow stains will appear. I had hoped that the deafening properties of the 3" of mortar would be good, even though only a single floor should be put above, but it is found to be worthless for that purpose. It has been suggested that a double-floor, with two layers of cheap felt between, would remove the sounding-board effect of the single floor, and, with the mortar, make a floor proof against the passage of ordinary sounds.

These partitions and ceilings are plastered as indicated, and all angles are cut through to the lath — a thing it is very hard to get the average plasterer to do. Then any change in the relative positions of the two backs does not produce ugly cracks across the face of the wall.

In using sheathing-lath so freely, it was feared that the greatest trouble would occur from the twisting and shrinking of the lumber, and cracking the plaster, but now, after heat has been in the building over two months, I am satisfied there are fewer cracks than would have appeared if ordinary lath had been used. The mortar adheres firmly to the surface, and the face of the plaster is less liable to breakage.

I now propose to build a floor as shown in No. 2, which, I think, will be a successful deafener, and it dispenses with the 3" of mortar, which in some cases would be an objection. The bottoms of all joists are run to sheathing-lath, the sides grooved for air-spaces, and above mineral-wool is used between wide joists.

While these methods of construction are not as cheap as the ordinary stud-and-lath, they are cheap compared with any of the ordinary methods of "fireproofing," or making slow-burning construction, and even than the simple use of wire-lath over studs and joists. I give below approximately the cost of the different modes of construction here.

With us there is much less danger from "dry-rot" than is usual, as nearly all of our lumber is cut from logs which have been in the water from six to eighteen months, and are *sonked dry;* that is, the water has driven out the sap.

PARTITIONS.

Cost of 100 square feet ordinary partition plastered 2 sides: —	
50 feet, 2 x 4 studs set	$1.10
22 yards lath and plaster	4.40
	5.50
Cost of 100 square feet of partition as shown in No. 1, plastered 2 sides: —	
200 feet, 2 x 4 run and set	4.60
22 yards plaster	3.30
	7.90
Cost of 100 square feet studs and wire-lath plastered 2 sides: —	
50 square feet studs, 2 x 4 set	1.10
22 yards plaster and wire-lath	9.90
	11.00
Cost of 100 square feet 3" hollow tile, plastered 2 sides: —	
100 square feet tile set	12.00
22 yards plaster	3.30
	15.30

FLOORS.

Cost of 100 square feet of ordinary floors without lining or finished floor — 2 x 10 set 1'-3" on centres: —	
125 feet, 2 x 10 set	$2.75
11 yards lath and plaster	2.20
	4.95
Cost of 100 square feet as shown in No. 1, 2 x 10, set 1'-0" on centres: —	
150 feet, 2 x 10 set	3.74
100 feet, 1 x 4 sheathing-lath	2.20
11 yards plaster	1.65
11 yards 3" mortar	1.32
	8.91
Cost of wire-lath construction: —	
150 feet, 2 x 10 set	3.74
11 yards plaster and wire-lath	4.95
	8.69
Cost of No. 2 construction: —	
650 feet, 2 x 3 and 2 x 6 set	15.24
11 yards plaster	1.65
	17.89
Cost of tile arches: —	
100 square feet tile	20.00
11 yards plaster	1.65
	21.65

In giving the cost of tile, arches and positions, no account is made of the iron frame, which is usually equal, if not greater, than the cost of the filling.

The building from which Nos. 1, 3, and 4 are taken is occupied by twenty-eight families, and the insurance rate is 90 *cents on* $100, *insured for five years.*

Yours truly,

JAMES C. PLANT.

[In describing this method of building, Mr. Plant sets an example which we would like to have followed by other architects who have experimented successfully or unsuccessfully with variations upon the ordinary methods of construction. — EDS. AMERICAN ARCHITECT.]

A CORRECTION.

NEW YORK, N. Y., December 26, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In your column of death notices of architects published December 22, 1888, you have attributed to Arthur Crooks the architectship of St. Thomas's Church in the Fifth Avenue, New York. This is incorrect, Mr. Crooks was in the employ of R. & R. M. Upjohn as draughtsman at the time St. Thomas's Church was built. The design and scheme of the building had been worked out to an eighth-inch scale for Dr. Morgan five years before Mr. Crooks came to this country, and the design and scheme of the building was made by my father. He was the architect of the building. According to our books Mr. Crooks entered our employ three days after he landed from England, the last of July in 1863, he then said he was not quite twenty-one years old, he remained in our employ for upwards of eight years continuously. In Mr. Crooks we always found an able and willing assistant. In England, he had been architect to a Mr. Sutton an architect of Nottingham, England. By publishing the above you will be correcting an error undoubtedly unintentionally made.

Yours respectfully, R. M. UPJOHN.

NOTES & CLIPPINGS

The Inventor of the Wheelbarrow.—There are probably very few people who know the name of the inventor of the wheelbarrow. The sculptor, painter, architect, engineer—in fact, many sided genius and universal scholar, Leonardo da Vinci, of Italy—the man who painted the original picture of "The Last Supper"—is the inventor of the wheelbarrow. His fertile brain conceived the idea about the time Columbus discovered America. It is hardly possible to think of a man who was touched with the highest order of the divine art of painting bringing himself down to the diametrically opposite study of a simple mechanical invention, but such is the case, says history.—*Chicago Herald.*

Increase in Brooklyn Bridge Receipts.—The annual report of the Trustees of the New York and Brooklyn Bridge shows that the receipts for tolls during the year ending November 30, 1888, were $917,061.56, divided as follows: Promenade, $16,960.63; carriageways, $37,251.50; railroad, $833,760.43. The tolls exceed those of the previous year by $757.65 for the promenade, $1,483.34 for carriageways, $34,490.16 for the railroad, and $37,247.33 in the total. The number of railroad passengers was 30,331,283, compared with 27,910,313 the preceding year; of foot passengers, 2,785,633, against 2,604,313 in 1887. This shows a total of 33,116,816 passengers, and a total increase of 2,512,980 over 1887. The largest monthly number of foot passengers was in April 262,778—and of railroad passengers in October—2,850,697—in which month also the total traffic was largest—3,116,198. The average monthly receipts have been $70,409.70, an increase of $5,606.11 over last year. The total receipts for the year were $1,012,254, of which $917,061.56 was for tolls, $84,880.58 for rents, $7,116.17 for materials sold, and $2,295.71 for interest. The expenditures for the year have been $883,497.22, leaving the balance on hand December 1, 1888, $238,746.01. Among the extraordinary expenditures were $40,033.28 for the new cable plant, $32,055.13 for additional real estate, $22,037.25 for Washington Street extension, $23,100 for six Pullman cars, $11,000 for two locomotives, $15,370 for lawsuits ($5,750 being for patent suits), and $17,000 for repairs and extensions. The pay-rolls amounted to $133,011.74, besides $30,199.20 in salaries. Of the total receipts from rentals $11,052.02 was for the 420 telegraph and telephone wires and the single Commercial cable.—*New York Evening Post.*

A Gigantic Electric-lighting System.—The newest item of interest in electrical development is the condensations printed in the electrical journals for the current week of the articles in the English electrical press, descriptive of the plan for the new Deptford Station of the London Electrical Supply Corporation. The *Electrical Engineer* says: Projects for central station electric lighting on a large scale in England are following one another with great rapidity, in London and in provincial towns as well. This recent activity is doubtless due in large measure to the improved situation of the capitalists who undertake such enterprises, consequent upon the modification by Parliament, of the onerous restrictions of earlier legislation touching their privileges, and still more perhaps to the widespread and successful introduction of the alternating current and transformer method of distribution for large areas. Chief among the new schemes which have marked the reaction following the removal of restrictions of the Electric Lighting Act is the Ferranti system to be used at Deptford. This is upon a plan so vast as to dwarf the most extensive appliances to mere toyishness into comparative insignificance, and its conception is so bold as to excite both the admiration and the apprehension of those best qualified to judge of such matters. If successful it will be a great advance upon present achievements. Mr. Ferranti proposes to employ a potential of 10,000 volts, with one side of the circuit bare and designedly grounded at innumerable points. The strongest arc-lighting current in use in Providence, has a potential of about 1,000 volts and this increase of tension will demand an absolute insulation, the possibility of which is still an open question. The Deptford Station has available about four acres of ground at the riverside, almost the whole of which will be eventually covered with the steam and electric plant, capable of lighting half of London. The "small" dynamos will have a capacity of 25,000 lights each, and will be the largest electric generators yet constructed, and the "large" dynamos, forty-five feet high over all and weighing 500 tons each, when driven by 10,000 horse-power engines, will be capable of supplying 200,000 lights each. The dynamos will be inclosed and magnetically locked by the exciting current so that it will be impossible to get a shock from the dynamos themselves. The conductors will also present a radical departure from anything practised at the present day. No precedents being available for the transmission of such high voltages, Mr. Ferranti had to invent a cable to suit the requirements of the case. Throughout the whole system one end of the primary is connected to earth and the difference of potential between it and the human body is therefore nil. The high-pressure end of the main is enclosed within this grounded copper conductor, separated from it by the most perfect insulating compound obtainable. By this means it is expected to deliver electricity at this enormous pressure, and yet render no more precaution unnecessary in running the conducting main than in placing an ordinary gaspipe. In the transmission of high electrical pressures, Sir William Thompson has shown that the interior of a solid copper rod is practically useless and the weight of the inside copper is thrown away. Mr. Ferranti has therefore made his inner conductor cylindrical of pure copper 3-16 inch in thickness. The high-pressure mains will be laid along the embankments and lines of the various railway companies and underground along the District railway. At the distributing points a transformer of 125 horse-power and weighing a ton will expand the current down to 2,400 volts, which is the pressure now used in the Grosvenor Gallery and will be capable of supplying 2,500 lamps of 10 c. p. From these stations the current will be distributed by overhead lines to private houses, each of which will have its own transformer, expanding the current until the pressure is only 100 volts, which can be used in the ordinary incandescent lamps. The Electrical Supply Co., limited, it about to install a Westinghouse plant, and a third undertaking, the St. James Electrical Light Co., has announced the intention to construct a station for 20,000 lamps.

TRADE SURVEYS

The features of the week are heavy traffic on nearly all trunk lines, and an active distribution of products of all kinds. The year's business, according to bank clearings, was slightly in excess of last year. Railroad-construction was about 3,000 miles less. Pig-iron output, exclusive of Bessemer, was fully up to 1887. The capital of manufacturing companies in the Southern States was $168,000,000. Stock operations last year show quite a falling off at all the exchanges. There was an increase in the number of firms of 37,000, according to one agency; the total number being put at 1,135,000. The failures for the year averaged one, for 110 firms. In New York 3,073 new buildings were constructed at a cost of $47,000,000, against 4,873, 1887, costing $67,000,000. Philadelphia expended last year $26,000,000 in buildings. Mortgage foreclosures, so far as returns are to hand, show a wonderful falling off. Business men are under less necessity to borrow, and are better able to pay, especially as much money is borrowed at from one to two per cent less than two or three years ago. There is considerable trouble in the far West over the lack of money, especially among small traders and manufacturers, but it is partly due to the fact that the activity in railroad-building for the past two or three years was not kept up. The Atchison has completed its line to Chicago, the St. Paul to Kansas City, the Rock Island into Colorado. The Denver, Texas & Fort Worth is delivering freights from New York *via* New Orleans throughout the Rocky Mountain region. This year the Northern Pacific will run unbroken trains from the Pacific coast to Chicago. The Baltimore & Ohio will probably get to New York, and New England will have a valuable additional outlet West *via* Poughkeepsie bridge. This little panorama shows substantially what has been done by the railroad-builders. Among the new roads projected are one from Omaha into Dacotah, 400 miles; one in Iowa to Superior points, 200 miles; one in Montana; one in Arkansas and one in Texas; all long lines. A road will probably be started this year through an unsettled part of California, parallel to the Southern Pacific and distant from it twelve to twenty miles. The architects and builders in the older sections of the country have no fault to find with present indications. In all probability builders will have more work than last year. Authorities in a half-dozen large Western cities have already made some little preparation for it to the extent of contracting for lumber. A large amount of new work will be undertaken west of the Mississippi. Combinations have been made looking to house-building on a large scale wherever encouragement may be offered. The greatest activity will be in the smaller towns, as was the case last year. Capital is taking more changes farther away from home. It is leaving its accustomed channels, and is finding better and more productive employment. Never in our history was there less speculation and less tendency to speculate, if exception be taken in the cases of a few successful traders. Values are more uniform. Railroad rates will probably fluctuate less than ever; but, if pooling is authorized, it will, for a while, introduce another unsettling factor.

Architects, especially in Eastern cities, incline to the opinion that their services will be in as great requisition as last year, and that suburban-residence work will be heavier. Summaries made by lumber authorities show that a very abundant supply of hard and soft woods will be thrown upon the market next year, and that, on account of the competition from the new mills both North and South, prices may not be altogether uniform. A very large amount of money will be expended by municipalities, big and little, for municipal improvements, such as pavements, water, gas, electric-light, etc. The builders of machinery and engines have had inquiries for a large amount of work. The builders of locomotives believe that from present indications they will have a busier year than ever in their history, and some large South American orders are in sight. The year's anthracite coal output finally foots up 38,000,000 tons. By next April there will be facilities for 4,000,000 tons additional. Throughout New England trade and manufacturing conditions are favorable. The print-cloth manufacturers, the boot and shoe manufacturers, paper-makers, machinists, and hardware manufacturers are all running full time, and the new projections indicate that the safe limits of productive capacity have not yet been reached. Other sections are flourishing trumpets and calling on all the world to look at them, but quiet New England is even surpassing them in enterprise and expansion without a word. Her capital moves the machinery in a dozen far-off States, and her brains control it. The records of the year's work so far as completed shows no decline in the volume of business. Much paper-making machinery has been added, machine-shops have been enlarged, more men are at work now than a year ago, and it is safe to say that there is much more work in sight. New England, instead of losing manufacturing advantages, is gaining. There are prospects for cheaper coal and iron, and perhaps lower-priced lumber and planing-mill products. Real estate valuations are even, and taxation is not increasing its burdens. Skilled labor is increasing in supply, and numerous small economies are being worked out. The expansion in the newer sections of the country bring wider and better markets to the far East. Abroad, matters are not mending. This year the big end of two hundred and fifty million dollars will be expended in war nonsense by the great powers, who imagine the people will stand such drafts forever. France proposes, if she can tax it out of the people, to put one hundred million dollars into destructive agencies. Germany has set aside fifty million dollars. Russia has borrowed one hundred millions. Austria wants twenty millions. Italy is scampering around among the money-lenders after twenty millions. Spain must have a small matter of five millions. Turkey has resolved on emptying seven-and-a-half millions or a new rifle. So it goes. The people see it all, and wonder when and how the end will come. All this plundering is in violation of the spirit of our civilization, and the men who are preparing to set the people onto each other will fall short of the mark. Bonds of sympathy and fraternity are strengthening themselves. The two Americas are the great outlet for the overflow population, and the outflow will increase as opportunities for making new homes in the New World multiply.

S. J. Parkhill & Co., Printers, Boston.

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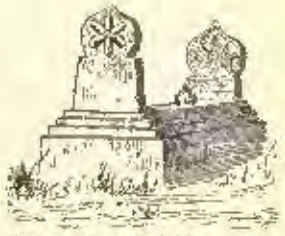
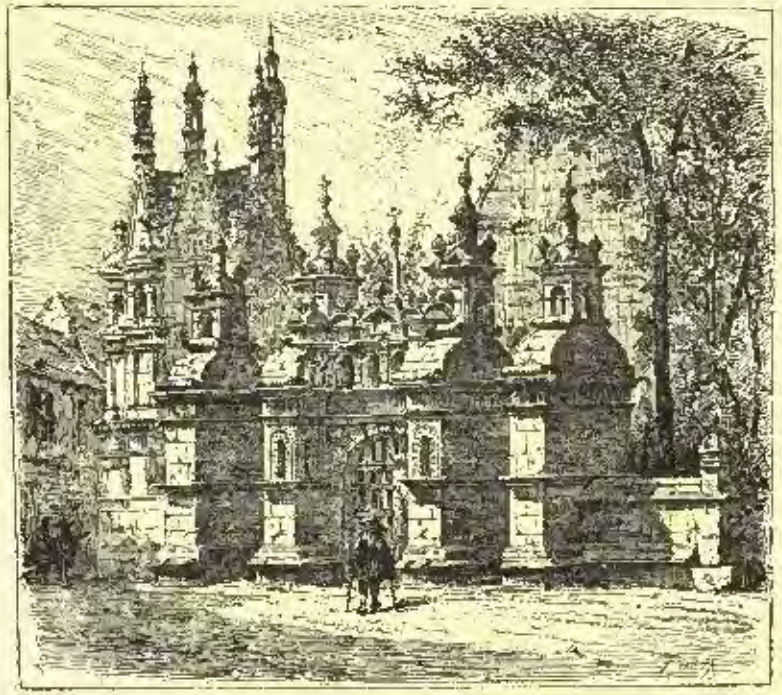


Arabian Tomb
after L'Architaivre.

Unfinished Monument to Mary Washington,
near Fredericksburg, Va.

Breton Cross.



CEMETERY ENTRANCE, ST. THEOGENNEC, FRANCE.
From Le Moniteur Des Architectes

Column at Ravenna, Italy.

Confederate Monument, Lexington, Ky.

TOMBS AND MONUMENTS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 681.

JANUARY 12, 1889.

Entered at the Post-Office at Boston as second-class matter.

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A LARGE portion of the profession seem to regard the protest against the Massachusetts State-House competition as a matter of local interest only, and overlook the fact that the wording of the text makes the protest one "against *this form* of competition," and it is solely because of this that we invite signatures from architects in all parts of the country. We hope that next week's list will show a very material increase over the one published to-day.

A CURIOUS controversy is going on in the newspapers between the Westinghouse Electric Company, representing a large amount of vested interest, on the one hand, and Mr. Harold P. Brown, who claims that he represents the public interest, on the other. It will be remembered that Mr. Brown, some time ago, wrote a letter to the New York *Evening Post*, over his own signature, calling attention to the dangerous character of the alternating electric currents used in the Thomson-Houston system, the Jablochkoff system, and several others. In reply to this letter, various anonymous insinuations were circulated, to the effect that Mr. Brown was in the pay of the Edison Electric Company, which uses only continuous currents, and implying that he was attempting to deceive the public, for the benefit of that company, by attributing imaginary dangers to rival systems of electric-lighting. Mr. Brown then, to fortify his opinion by the strongest evidence, applied to Mr. Edison for the use of his great electrical laboratory at Menlo Park, for the purpose of trying whether alternating-currents of the strength used in lighting would be fatal to animals. Dogs of different sizes were first operated upon, and, while one weighing fifty pounds received six successive shocks, the last shock lasting two and one-half seconds, with a continuous current of intensity varying from one thousand to fourteen hundred and twenty volts, without experiencing any injury, a fifty-six pound dog was killed in five seconds by an alternating-current of one hundred and sixty volts, a little more than one-ninth the intensity of the harmless continuous current. As soon as these results were published a new attack was made upon them and Mr. Brown. The Society for the Prevention of Cruelty to Animals was called upon to put a stop to the experiments, while the experiments themselves were declared to be of no value as showing the relative effect of alternating and continuous currents on human beings, because the dogs treated were smaller than men. Mr. Brown then, with the cooperation of the Commission appointed by the State Government of New York to determine the best method of executing criminals by electricity, carried out a new series of experiments upon a horse weighing twelve hundred and thirty pounds, and two calves weighing about as much as an average man. With all death followed in a few seconds the application of an alternating-current of seven or eight hundred volts intensity.

APPARENTLY, the public apprehension must have been so aroused by these experiments as to make itself felt in the business of lighting by alternating-currents, and the Westinghouse Electric Company, which is said to control in this country all the systems employing alternating-currents, thought fit to hire a large number of newspapers to publish a letter, to which every honorable man must be sorry to see the name of Mr. George Westinghouse, Jr., subscribed. The letter begins with a reiteration of the insinuation, which has been refuted over and over again, that Mr. Brown is "conducting his experiments in the interest and pay of the Edison Electric Light Company," followed by an assertion that "it is generally understood" that as the Edison Company's business may be vitally injured if the alternating-current apparatus continues to be successfully introduced and operated, "the Edison representatives, from a business point-of-view, consider themselves justified in resorting to any expedient to prevent the extension of the system." As the idea that "the Edison representatives" have anything to do with the "expedients" in question rests entirely on the false assumption that Mr. Brown is one of those "representatives," it does not need to be disproved; but most people who have followed the course of electric-lighting in this country will be tempted to point out to Mr. Westinghouse that with the Edison Company the "business point-of-view" has hitherto been generally identical with the point-of-view of honesty and decency, and that, if he considers the systems that his company controls superior to the Edison system, he will get more public sympathy by describing their advantages without any accompaniment of bragging and slanderous imputations. Proceeding to discuss the facts in the case, Mr. Westinghouse says that the animals killed by the alternating-currents in Mr. Brown's experiments were "carefully placed" so as to receive the shock in a way that would be impossible under ordinary circumstances, and offers to produce "a large number of persons" "who have received a shock of one thousand volts from alternating-currents without injury," explaining further that alternating-currents are less dangerous to life than continuous currents, because the latter decompose the tissues, while the former only affect the nerves.

MR. WESTINGHOUSE'S contemptuous and abusive advertisement has now, very naturally, stirred up Mr. Brown to make a reply which is a little more vigorous than we could wish, inasmuch as it goes out of its way to impute to Mr. Westinghouse motives which would be much better left for the readers of the correspondence to infer for themselves. In regard to the facts of the matter, Mr. Brown says that however it may have been with Mr. Westinghouse's friends, who have "withstood" pressures "exceeding one thousand volts" "without permanent inconvenience," many people have been already killed by the alternating-currents, and many more have been crippled for life, and are supported by pensions from the electric-lighting companies which furnish such currents. Moreover, he asserts that the alternating-current wires cannot be made safe, for the reciprocating movement greatly increases the tendency of the electricity to leave the wire, and, according to his tests, the leakage from the wires used by the alternating-companies to the ground is sufficient to kill or cripple any person standing on a damp place and touching either wire, while with a continuous current, even of very high intensity, a fatal shock can only be received by touching both wires of the circuit. As to whether it is more agreeable to have one's tissues decomposed by a continuous current, or one's nerves shocked by an alternating one, he proposes a simple experiment. As he thinks the alternating-current the more dangerous, and Mr. Westinghouse says that it is less so, he suggests that Mr. Westinghouse and himself should meet in some public place and each grasp a pair of wires of his favorite variety. Through these wires should then be sent electrical currents, beginning with a pressure of one hundred volts, and increasing by fifty volts at a time. Mr. Brown, who is to hold the continuous-current wire, offers to load at each increase of

pressure, and proposes that the one who first cries enough shall be considered to have acknowledged himself in error. This is certainly a fair offer, and, if Mr. Westinghouse does not like to leave his business for such trifles, we strongly advise him to send one of his thousand-volt salamanders as his champion. As the controversy now stands, his friends maintain that the current used in his system is "absolutely harmless," and, consequently, we suppose, that the persons who have been killed on touching the wires carrying it must, by a singular coincidence, have died of consumption, or old age, or some other natural ailment just at that instant. Mr. Brown maintains that an alternating-current of one-sixth the intensity used by the Westinghouse people has killed a large dog in five seconds in his experiments, and that, for safety, the tension of alternating-currents ought to be limited by law to three hundred volts; and unless the Westinghouse companies can show a man receiving a shock of greater force than this without injury, we are much inclined to think that the public will agree with him.

A CURIOUS story about an American town comes to us by the way of Paris. According to this, there is in the city of Brooklyn a lot of land which has no owner. The lot is not very spacious, being only twenty inches wide, by, apparently, two hundred feet or so in length, but it is regularly taxed to "Owner Unknown," and as regularly put up at auction for the non-payment of taxes by this mysterious individual, but finds no purchaser, the building laws of New York being unfavorable to the erection of a house on a lot of those dimensions. The explanation given for the origin of this orphan estate is that the block was laid out many years ago with the standards of length then in use, but was not divided into lots. Long afterwards, when the land had become valuable, the sale of the tract in lots began, the measurements of the lots being taken from the street-lines, which had been fixed at the original survey. The length of the legal standard for New York had, however, changed since the survey was made, and, when all the lots had been sold by measurements conforming to the new standard, there still remained the strip in question, which was included in nobody's deed, and could not be conveyed to any one without an apparent violation of the laws of arithmetic.

ALTHOUGH this explanation may satisfy the Parisians, we are too proud of the astuteness and ingenuity of our countrymen to let it pass without question. We have seen a lot not much more than twenty inches wide in an American city utilized for a very profitable little fruit store, by the simple process of roofing it in, and furnishing it with a movable front, which served as door, counter and window, while there was plenty of room for reserves of goods in the space behind; and it is incredible that the Brooklyn people should be so blind to commercial opportunities as to let this one escape. Nor can we quite believe in the story of the origin of the surplus lot. So far as we know, there has been no change in the American standard of length, since Brooklyn was laid out, which would account for any such residuums of territory; and it is far more likely that the original surveyor used an incorrect chain, or forgot just where the end of it had been, and drove his stakes somewhat at random. Scores of errors of this sort are discovered in most of our States in retracing with modern instruments the boundaries given in old deeds, but any excess of territory is usually amicably divided among those who have claims upon it.

MR. HERBERT D. APPLETON, the earnest and thoughtful President of the London Architectural Association, recently read a paper before the Birmingham Architectural Association on the "Affiliation of Student Architectural Societies," which is full of valuable suggestions, as well for us as for those to whom it was particularly addressed. By the new charter of the Royal Institute of British Architects the London Architectural Association has a representative in the Council of the Institute, and Mr. Appleton thinks, with reason, that this arrangement could be made much more useful to the younger members of the profession throughout Great Britain by the establishment of somewhat intimate relations between the London Association and those which already exist, or which may be formed, in the provincial towns. It is a curious fact that the adoption of the compulsory examination for admission to the Institute has greatly fostered the development of student societies, which find plenty of reasons for existence in the advantages which their classes offer for preparing their members for the Institute examination, and the ready communication between the Institute and the students, afforded by the presence in the government of the Institute of a representative of the federation of student societies, would be most useful in preventing misunderstandings, in improving from year to year the system of examinations, with the concurrence of all the parties interested, and in promoting professional attainment and inculcating the best professional ethics. Beyond this, however, Mr. Appleton thinks that a regular communication between the student societies will be of much value in many ways. It would not take long, for instance, for a body comprising several hundred young men to form a lending-library of all the best architectural books, journals and photographs, and pass them from hand to hand, under the advice of persons familiar with the subject, until all the students who cared for it had acquired some knowledge of the standard works, as well as special acquaintance with such particular departments of art or science as pleased them. It seems to be the case in England, as here, that the public libraries are deplorably poor in books of value to the student of architecture. In this country, according to our experience, the few libraries which contain even a meagre assortment of standard works will not allow them to be taken from the room in which they are kept, so that they are almost entirely unavailable for young men employed in offices, while the selection is usually so poor that students who have not been warned what to avoid are likely to waste a large part of the time which they can manage to devote to them. Under such circumstances, a proper students' lending-library would be invaluable, while, as Mr. Appleton suggests, until this could be formed, much good might be done by appointing members in the various towns to examine the local libraries, and urge the purchase of books from a list to be prepared for the purpose by a library committee or some similar authority.

BESIDES all this, Mr. Appleton proposes that the local societies should mutually help each other in facilitating the study of buildings, both ancient and modern. He cites the example of the Cycling Club, which, by the appointment of "consuls" in all the principal English towns, to direct tourist members of the club to places of interest, and give information about roads and inns, has immensely facilitated the use of wheels for pleasure travelling, and proposes that the affiliated societies of students of architecture should in the same way appoint members in as many places as possible, as local advisers to students on sketching-tours. This, to our mind, is one of the most valuable suggestions ever made for the benefit of young architects, and the plan might well be carried out on an international scale. Every architect who has made a sketching-tour in an unfamiliar district knows the difficulty of finding what he wishes most to see. The guide-books give him a little information about the principal buildings, and tell him how to find the cathedrals, which are usually visible for five miles around, but they are silent in regard to thousands of lovely "bits" more available for sketching, and quite as instructive as the more renowned structures. In fact, the great cathedrals are so familiar by photographs and drawings that they tempt the sketcher less than buildings which he never heard of before, and to which his sense of proprietorship as a discoverer gives an interest and charm which fix their beauties of design or construction in his mind, and lend facility to his brush and pencil. We can well recollect the pleasure with which we stumbled upon the little Carmelite church and convent in Paris, on the south side of the Seine, near the Hôtel Cluny, or the church of Saint-l'Ère at Chartres, or an old tower of brick and terra-cotta in a back-yard at Milan, and how novel and delightful they seemed after the familiar grandeur of the cathedrals, and do not doubt that many of our readers have had the same experience, and have, like us, lamented the fortune which, while it brought us to a few treasures, led us in ignorance past hundreds of others, to which a fellow-student acquainted with the region could have directed us. In the study of modern architecture, which Mr. Appleton strongly recommends to young men, the system of architectural consuls would be of the greatest benefit. We often have occasion to furnish professional tourists, both young and old, with lists of the most interesting buildings in the American towns with which we happen to be acquainted, and, judging from our own experience, the amount of time that could be saved by having such lists prepared by a competent resident in each place would be enormous.

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1]—II.

Elephant de la Bastille. Suggestion of M. Alavoine.

WITH sundown the air has suddenly become sharp and keen, much like that of late October at home, differentiating the midwinter night of this region considerably from the midwinter day. The stars glitter brilliantly in the clear, cloudless sky, and an impressive silence broods over the country, hardly disturbed by the slight sounds of the camp—the Mexicans quietly chatting in their tent, the cook setting things to rights in the kitchen for the night, and the "chomp, chomp, chomp" of the animals at their fodder in the neighboring corral. The lights in the tents shine through the canvass and give them a cheery aspect: from the inside there is heard the steady hum peculiar to blazing wood in confinement, for a genial warmth is maintained in little stoves simply made of sheet-iron fashioned into a cone shape and kept full of mesquite wood, which is almost as hard and heavy as iron and gives out a heat like coal. These stoves, with the pipe running straight up from the top of the cone are simply inverted funnels, with a little draught-hole at the bottom. The cold of the nights would occasion no discomfort to house-dwellers in this climate, but it easily penetrates the tents, and brisk fires are needed for comfort, even late into the spring.

Mr. Cushing's tent, occupying the centre of the camp, has a cosy, home-like appearance, with the touches of decoration and aspect of order that betray the feminine presence. It is a large wall-tent, divided by a curtain into two rooms. A canvass covers the ground and makes a neat floor, cases of shelves contain a considerable reference-library for use in working-up the results of the excavations from day to day, and there is a convenient portable desk; shelves, desk, etc., all made so as to be packed into small compass and easily transported when camp is moved. Bright colored Zuñi blankets cover the two cot-beds, and there are tastefully displayed on the walls and shelves some handsome examples of the decorated basketry of the Pima Indians, mostly with bold, rich designs woven in black and white, and sometimes additional decoration painted in red and green. There are also a few specimens of the ancient pottery excavated near by. A sewing-machine lends an air of domesticity to the place, and several candles illuminate it.

Mrs. Cushing, who is the custodian of the smaller treasures of the collection and guards them with jealous care, brings them out and delights my eyes with some exquisite arrowheads, carefully chipped and graceful in form, made of quartz and agate, or other colored stone, evidently chosen with regard to its beauty; ornaments of turquoise and beads of shell; bracelets and finger-rings carved from sea-shells, and last and most beautiful, a wonderful frog found wrapped in asbestos in a sacred jar excavated from the ruins of the great temple of Los Muertos. It is an exquisite piece of work, showing not only a genuine æsthetic sense possessed by the ancient people, but an artistic conception and decorative quality that would do honor to our own race and civilization if produced to-day. In making it a shell similar to that of a quahang, or "little-neck clam" was taken and on its convex side the effigy of a frog was produced in lines of mosaic-like fragments of turquoise embedded in a black cement made from the gum of the greasewood, or hediondilla. The line down the centre of the back was made in red bits of shell, resembling coral in color. The whole was worn down smooth by rubbing. The effect is extremely realistic—an exception to the conventionalism that characterizes most of the art of this, in common with other North American primitive cultures. Prof. Edward S. Morse, who visited Camp Hemenway in April, took this frog East with him for safe-keeping, and stopping over in New York he showed it to the people at Tiffany's, who expressed great delight and marvelled that such a thing could have been produced by an ancient people in this country.

The rest of Camp Hemenway consisted of a tent occupied by Mr. Hodge with his desk and records, a tent adjacent occupied by Mr. C. A. Garlick, the surveyor and practical superintendent, a small tent in which Miss Magill was domiciled, commonly known as the "dog-tent" from its diminutive size and fancied resemblance to a kennel, a tent occupied by Dr. ten Kate, a Sibley tent for guests, a large tent for housing the collections, with a shelter of canvass, called by its Spanish name of *ramada*, originally meaning "brush-shelter," adjacent as an annex; a tent for the Mexican laborers, a tent for the photograph material and other stores, a shelter for the baggage, a little "dark tent" for photographing operations, and a shelter for the harnesses. The mules, with the two horses, are tethered around a large crib under one of the few mesquite trees that have been left standing about the camp; they need no shelter in this climate and beyond an occasional kick or bite at an encroaching neighbor they live together in amity.

The next morning I make the acquaintance of Ramon Castro, the noble-faced young Mexican who acts as foreman of the laborers; faithful, industrious, and an innate gentlemen. Later in the day Don Carlos, as Mr. Garlick is called, drives in from Phœnix, fourteen miles away, where he has been over night on his semi-weekly errand of purchasing supplies for the camp.

It is a typical morning of this region, clear, sparkling air, and the sun soon warms up the world—or all that portion that lies about us—into summerish cheeriness, melting the ice that has skimmed over the buckets in the camp and fringed the ditches with frosty lace. But off in the upland regions of Arizona, three or four thousand feet above our level, they are having some real winter, as the snow tells us that is glittering on the mountains.

A great mound lies about a quarter of a mile distant, rising in a low, broad mass of brown earth above the plain, and something like twenty-five feet above the general level. It is the ruin of the great central temple of the place, and Mr. Cushing takes me out to see it. It has been excavated sufficiently to show its construction. It was originally probably six or seven stories high, and divided into various rooms on each floor. Only the remains of two stories are now to be traced. The outer wall is very thick, something like three or four feet. The material is indurated earth, and in the course of excavation Mr. Cushing made a highly important discovery concerning the constructive methods of these people. Along the top of these outer walls is seen a double row of holes running down perpendicularly, and each row a few inches within the outer and inner face of the wall, respectively. These holes were found filled with the powder of decayed wood, and some large fragments of the wood itself were discovered. Further investigation showed that these walls were constructed by first driving a double row of stakes into the ground, and then wattling-in between the stakes so as to form two parallel lines of wattled work. Building this wattling up to a height of a foot or two, the space was filled with moistened earth, packed down firmly, perhaps by treading with the feet, or tamping with heavy stones. The wattling was then built up higher, and the process continued until the wall was carried to its full height. Thus a solid structure was formed with walls enclosed within a wattled surface. This surface formed a sort of lathing, and it was covered with a thick plastering of mud with a smoothly finished surface such as is still to be found on the walls at Casa Grande after a lapse of centuries. It was unknown that this was the method of building these massive walls until Mr. Cushing made this discovery. As soon as he saw these double rows of holes he declared what their origin must be, and said that wattling must have been used in the way it proved to have been, as revealed by subsequent investigation, where the impress of the wattling was found plainly made inside the walls. Here, then, was a most significant fact. The origin of pottery in forms of basketry has long been made familiar. This discovery showed that not only did the primitive utensils of burnt clay, but also the primitive structures with walls of clay, find their origin in basketry types. For, just as the coating of baskets with clay suggested the making of pottery, so this form of structure bears the records of the story how the primitive wattled hut, first rendered more substantial and weather-proof by a coating of mud, suggested a more massive form of construction with a basketry basis. Possibly all mud or earthen walled construction may thus have been developed from basketry.

In this connection, a subsequent discovery deserves mention. Readers of the *American Architect* may remember an article that appeared in these columns a few years ago, briefly recounting how Mr. Cushing discovered that in the ancient Pueblos the doors to the houses were made of stone slabs, through an analysis of the etymology of the modern Zuñi word for door, which signifies "a wooden stone close," showing that before boards were made available for the construction of their doors, they must have closed their doorways with slabs of stone. Thus throughout their language the successive stages through which their methods of house-construction, their implements, etc., passed in their development from lower or ancient to higher or recent types are preserved in the structure of their words. In investigating the ruins of Casa Grande, one of these "stone closes" made of mud was found in the shape of a great and heavy block of adobe, nicely finished with square corners, and accurately fitting into the place where it filled a doorway from one of the rooms to another. Subsequently, in excavating the ruins of a smaller temple in Las Acequias, one of the ancient cities near Los Muertos, a similar door of adobe was discovered lying upon the ground close to the doorway to which it belonged, its position such that it might readily be raised to fill the opening. These huge blocks were probably made in moulds of basketry, and their surfaces afterwards smoothly finished by hand. Even if moulds of wood were possible, they would have been so difficult to make with their crude implements that the idea would hardly have occurred when basket-work was so universal, and so easily made available for plastic purposes. The greater portion of the soil in these regions contains elements of clay and of natural cement, so that when indurated it hardens to an almost rock-like consistency.

From the top of the temple-mound there is a good view over the country. We are just about on the low divide between the Salado and Gila Valleys, and from this point the water in the irrigating-canals, brought up gradually to this level from the Salado above, runs down towards the Gila, instead of back towards the Salado. When the operations of the expedition began at this point something like seven months ago, it was supposed by the settlers that the supply of the irrigating-canals would hardly reach much farther southward, but the researches showed that the irrigation-works of the ancient inhabitants penetrated far beyond, and, in consequence,

[1] Continued from page 10, No. 680.

the available land in this region has all been taken up, and there has been a great development all around, with thousands of acres brought under tillage.

Therefore, the landscape has undergone a rapid transformation. When the camp was established here, the section upon which the main portion of Los Muertos stands was covered with a thick growth of very old mesquite trees. Only the great mound betrayed the existence of an ancient city on the spot. The other ruins were hardly discernible. The whole place has now been cleared and "brought under water," as they say here; that is, brought under irrigation. Only a few trees are left standing just about the camp, and the owner of the section, who took it up under the Desert-land Act, has sown the greater part of it with barley. Thus the land is resuming the fertility which characterized it ages ago. The settlers have made a mistake in making such a clean sweep of the mesquite. With a few dozen trees left on each section, standing singly or in groups here and there, the appearance of the landscape would have been much improved, and shade afforded for cattle in their alfalfa pastures during the summer heat. With its thirst amply gratified, as it is on irrigated land, the mesquite becomes quite a different tree from the scraggly, dwarfed growth of the desert-plains, with misshapen, unsound, contorted limbs. Given plenty of water, it becomes inspired with new vigor, and it lifts its head proudly high into the air, animated with health that becomes manifest in symmetrical shape.

Objects of considerable size soon lose themselves in the vastness of such a landscape as that spread before us; the white tents of the camp become mere specks on the plain, and the little shanties of the settlers on neighboring lands become so diminutive as to afford a scale for estimating a distance that otherwise would prove very deceptive in this clear air.

The land chosen by Mr. Cushing for his excavations has been kindly left undisturbed by the owner, beyond clearing it of its trees. Low mounds slightly rising from the level indicate the ruins, and large areas laid bare testify to the industry of the laborers whom we see, here and there, casting out the earth with their shovels. We stand a long time watching them at their work. The Mexican laborers have gained something of the enthusiasm of Mr. Cushing, and are eager for results. When something is found they gain new encouragement, and their shovels and picks are plied with greater celerity. They are gentler, more impressionable and receptive than men of a corresponding grade in our own race, and seem to have a greater natural intelligence. Their training has made them careful, and, when evidences of the presence of pottery, of skeletons, or other objects are encountered, they proceed cautiously, and do their best to remove intact what is found. Ramon, in particular, has been an admirable disciple under Mr. Cushing's schooling, and he has become a practical archæologist, with an almost intuitive capacity for discerning the presence of ruins and relics. He can trace the course of walls unerringly by indications imperceptible to any one else except Mr. Cushing, and marks out with his shovel the lines for the men to follow in their excavations. He will likewise tell just where the skeletons are to be found in the house-ruins, and one day, at Las Acequias, I see him fill Doctors ten Kate and Wortman with astonishment and admiration; they are anxious to find some good skeletons, and are beginning to be discouraged at the prospect of encountering them in a certain excavation, where two badly-decayed ones have been found near the surface. "Let us dig deeper," said Ramon, "and we shall find three fine *difuntos*: one here, one here, and one here," indicating the places and the positions of their heads, and, sure enough, they were soon found. "*Es usted un hombre de mucho talento!*" I remarked, in response to Dr. Wortman's enthusiastic request to "just tell him he is a mighty smart man!" and a modest smile of gratification illuminated Ramon's expressive features.

The excavations of the house-ruins were usually carried to a depth of three or four feet below the present surface of the country, laying bare the remains of the walls, and showing the interiors. The only evidences of these houses, which had long been concealed in the mesquite forest that had grown up over them, perceptible at first sight, was a slight and gradual elevation above the surface formed from the gradually crumbling material. In the excavation work it was difficult to distinguish the walls from the material that buried them, being of the same color and quality of earth, and varying only in hardness. Therefore, the sense of touch was the determining factor in bringing them to light. One of the workmen, in his ambition to please by laying bare a goodly line of wall would habitually be led astray by his imagination and frequently show a considerable stretch of "*pader*" as they called the Castilian *pared* or wall, in their Sonora vernacular; but the test of a not over-vigorous kick from the foot of Mr. Cushing or Ramon, whose practised eye could detect that no wall belonged there, would bring the sham structure down into an ignominiously crumbling mass. The real walls would not yield to such an assault, but, after months of exposure to sun, wind and rain still showed the plans of the great blocks of buildings to which they belonged, often covering an area of an acre or more, and honeycombed into small rooms and narrow passages.

The domestic utensils would be found undisturbed in just the places where they belonged in a well-regulated Pueblo household, unbroken save by the falling walls or the weight of earth upon them. This fact indicated a deliberate abandonment of the place, under such a *taboo* as would be laid upon it by the priesthood in the case of a region made unstable and uninhabitable, according to their notions, by an earthquake or succession of earthquakes, such as Mr. Cushing found evidence of. Here, and nearly universally among all the ruins explored in this and the Gila Valley, the charred remains of the roofs were found. This might have happened by the roofs of earthquake-demolished houses falling in upon the hearth-fires, and communicated to the adjacent houses. The uniformity with which the roofs are everywhere burned, however, seems to militate against their destruction in this manner. It might have happened, however, that the whole region was overwhelmed by a savage horde like the wild and nomadic Apaches, who exterminated the inhabitants and burned their towns, or caused them to flee to other parts of the continent, possibly thus putting in motion the migratory movement southward that established the Mexican cultures. An investigation of ancient ruins at various stages southward in Mexico, beginning in Chihuahua and Sonora, as careful as that which has been pursued here, is of importance in settling these questions, for the conditions in which they were left, in comparison with those here, would tell much. It would seem that an invading horde would be likely to sack the houses and smash their contents. On the other hand, if the towns were left deserted they might remain unmolested even after the lapse of years, for the superstition of other tribes settling in the region would very likely prevent their venturing within the precincts of a place, much more across the thresholds of its dwellings, that had been abandoned because of divine disfavor, and over which still presided the powerful demons who would work harm to all who might be so rash as to defy them. But, whence, then, the universal conflagration that seems to have visited every one of these ancient towns? Possibly the departing inhabitants might have applied the torch themselves, making a final sacrifice of their abandoned homes in hopes of thereby regaining the favor of the gods for their new dwelling-places.

Beneath the floor of nearly every house are found buried at different depths and often in three successive layers the skeletons of members of the family that occupied it. The topmost skeleton was invariably that of a young person; on account of their immaturity, and also from the fact of being near the surface, these skeletons of the upper tier were in the worst state of preservation. It seems likely that, when the young persons of a household began to die the house was abandoned because of the misfortune that had come upon it, thus accounting for the fact that the last burials made in a house were those of young people. Another interesting fact was that it was the custom to bury an infant beneath the kitchen hearth. This practice of house-sepulture could not have been promotive of sanitary conditions, though, in this dry climate, the results would not be so disastrous as they might have been elsewhere. Mr. Cushing, while in Zuñi, was puzzled to account for the fact that graves were called the "houses of the dead," but the discovery of this custom of house-sepulture threw light on the subject. Ancient Pueblo skeletons have hitherto been very rare, for explorers, not suspecting the custom of house-sepulture, could not find where they were buried.

But a small proportion of the remains was disposed of by sepulture, for that was a privilege only accorded to members of the priestly caste or of the esoteric societies, whose control over the soul was believed to be such that they had no need of external aid to separate the soul from the body at death. The ordinary people were cremated, and the pottery vessels containing their remains were found buried near the bases of pyral mounds, or great heaps wherein were found the fragments of the personal belongings of the dead, burned with them to accompany them into the other world. These vessels in which the dead were buried were usually plain, while the food-bowls and water-jars buried with the skeletons exhumed in the houses were, for the most part, handsomely decorated.

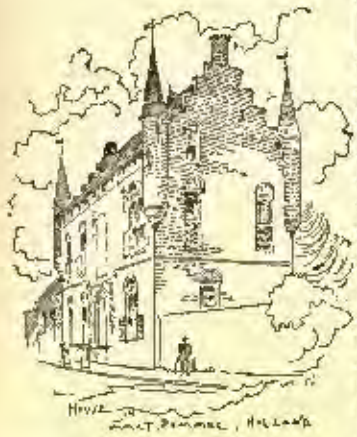
In Mr. Cushing's paper on the evolution of Pueblo pottery, contributed to the Fourth Annual Report of the Bureau of Ethnology, the growth of form from primitive types was traced as clearly as is the course of development in a chain of species in natural history. Some of the types necessary to complete the chain were not to be found at that time, but he pointed out what they should be. All the missing types were found here in the course of these excavations, thus substantiating the correctness of his reasoning.

Owing to the nature of the soil, which is exceptionally rich and retentive of moisture, encouraging the penetration of the roots of vegetation to a considerable depth, and probably also to a great extent due to the antiquity of the remains, the pottery found here at Los Muertos is very tender, and falls easily into fragments, requiring particularly careful handling. Close examination of pieces freshly excavated will shew how delicate little rootlets have wrapped their fine net-work all around them, and with their subtle acid extracted from the pottery some element that gave it cohesion. For the same reason the skeletons excavated here at Los Muertos crumble after exposure, so that it is almost impossible to preserve them, despite the utmost skill of Dr. Wortman. The potsherds found on the surface are as hard as when freshly burned. Both the pottery and the skeletons found at Las Acequias were much better preserved, owing to the more gravelly nature of the soil there.

Sylvester Baxter.

Destruction of an Ancient Norwegian Church by Fire.—The Nes Church, by the Lake Mjösen, in Norway, so well-known to tourists through its picturesque situation, was totally destroyed by fire the other day. It dated from the early part of the thirteenth century. The fire was caused by the carelessness of workmen.—*The Builder.*

THE LEAGUE EXHIBITION.—I.



NOW that the Annual Exhibition of the New York Architectural League has become an established factor in professional life, the first duty of the conscientious critic is to try to compare each year's collection of drawings with those of the preceding year, so as to trace, if possible, the tendency of a branch of American art which is unquestionably gathering strength and courage for undertaking a brilliant flight at no distant day, and to do what little he can to point out the stumbling-blocks which appear likely to be found in the way of true progress.

On the whole, the present exhibition cannot be called an advance upon the last one. The general character, both of the design and draughtsmanship, is better, and there is a notable absence of the monstrosities which in former years have disfigured the walls, but, at the same time, there are very few of the conspicuously beautiful examples, either of drawing or architecture, which do most to instruct and attract the public, and give the greatest value to an exhibition. Another thing that strikes the experienced spectator is that although the most renowned of the American designers are represented, their work is, as a rule, inferior to that shown by the same men in former years. We find still in the catalogue the familiar names of Rossiter & Wright, Lamb & Rich, John Calvin Stevens, Burnham & Root, Cass Gilbert, Babb, Cook & Willard, Brunner & Tryon, and a dozen others, but on going with pleasurable anticipations to examine the numbers to which the names are attached, we find in very many cases work bearing the obvious marks of having been principally designed by assistants, or "dashed off in a hurry," or "got through as rapidly as possible," or offering in other ways a very slender flavor of the talent which we once admired so much.

It is easy enough to account for this. The authors of the works which charmed us two or three years ago are now in the full tide of what their friends call prosperous business, and, instead of designing, have to spend their time in adding up, or rather, in subtracting from, plumbers', masons', carpenters', gas-fitters', plasterers' and painters' bills; in listening meekly to the objurgations of their female clients, who refuse to be comforted because their victim forgot which house was to have six shelves in the kitchen dresser and which was to have only five; or in resting in terror a thousand miles across the country, because a disappointed local contractor has discovered that their church tower, in whose natalis they took particular pride, is "a bulgin' about a third of the way up," and the church committee, to whom he has communicated this information, have hardly been able to wait for the arrival of the architect with his explanation, before voting to displace him, and appoint a protegé of the contractor's in his stead. As for the older lights of architectural drawing, Stanford White, McKim, W. R. Emerson, E. C. Cabot, T. P. Chandler and others, we do not find them personally represented at all. Whether their omission this year to exercise their powers for our admiration is due to the fact that all their leisure time is consumed in cutting off interest coupons from their stacks of investment bonds, we cannot say, but, whatever the cause may be, it is none the less a misfortune for American architecture that the most capable and brilliant men in it, in the height of their powers, should be compelled by our system of practice to abandon personal work, and substitute the pale reflection of themselves which is obtained by "influencing" a corps of clever draughtsmen. We are not consoled for their absence from the exhibition by the appearance of a few new men of great promise, for, although it is pleasant to see young designers coming forward and developing year by year into skilful and accomplished architects, there is no art in which the process of development continues longer, and, if circumstances would permit, the men who delighted us by their designs ten years ago could do work now surpassing that as much as that surpassed the crude efforts of their student days.

Looking through the entrance-door of the large room in the admirable Ortgies gallery, we find the general coldness of effect of the black-and-white drawings relieved by spots of color judiciously dispersed about the walls. Many of these are furnished by the always interesting designs for stained-glass lent by the faithful friends of the League, the Tiffany Glass Company. This year we are glad to remark the absence of any sketches for stained-glass wainscots, and there is rather more variety than usual about the window designs. Some of these use nothing but pieces of opal glass, put together with the smallest possible modicum of design, so as to depend almost entirely upon the play of color in the glass itself for effect — a method of design which, both in theory and practice, we cannot help considering an abuse of a most beautiful material. Some of the other sketches show novel, as well as successful treatments of figure and decorative subjects, and the Tiffany Glass Company evidently does not intend to have the great art of glass-staining stagnate in its hands. The first black-and-white drawing that we come to is one of Mr. Pennell's *Century* sketches. Several others are hung about the room, and, of course, all are good, the best being perhaps the pen-and-ink drawing of Plantin's studio at Antwerp, well known by its publication in the *Century*. Near by are two pen-and-ink sketches of houses, one by Mr. W. A. Bates, and the other by Messrs. Lamb & Rich, both tolerably good, and a colored drawing of St. Mark's Church at Kansas City, by Mr. T. K. James, which is also pretty good. Then comes a very brilliant pen-and-ink sketch of the portal of Prince Otto Henry's Palace at Heidelberg, by Sidney L. Smith. This drawing is worthy of study by architectural draughtsmen for the perfection with which the shadows are rendered. We are accustomed to think of Mr. Ruskin as a visionary egotist, and, very properly, to warn our pupils against reading the "*Stones of Venice*," or the "*Seven Lamps*"; but there is one book of his, the "*Elements of Drawing*," which every draughtsman should own, and more than that, should utilize by thoroughly mastering every exercise in it. In this way, more rapidly than by any other method we know of, can one acquire the ready perception of delicate differences of light and shade, and the precision in representing them on paper, which form the foundation of good pen-and-ink drawing. Mr. Smith, however he formed his hand, has secured the evenness of shadow which is so hard to obtain, and which Mr. Ruskin's exercises develop so surely, and his drawing is a signal illustration of its value.

Number 8 is a pen-and-ink drawing done with liquid sepia, a medium which seems this year to be greatly in favor, and, with its near relative, the mixture of India ink and burnt sienna, revived from the grave in which it has lain for ten or fifteen years past, to have almost driven out the indelible brown ink which was once so popular, but, we believe, is not used in a single pen-and-ink drawing in the exhibition. The sketch in question shows very well the merits of the new medium, which is dark enough to give force, without the harshness and coldness of India ink; and although the design and the drawing are both rather thin, the effect is pretty. Next to this is a drawing in black ink by Mr. E. R. Tilton, purporting to represent "Bits of Italian Detail," of which we wish we could speak as well. Mr. Tilton is by no means a bad draughtsman, and his subjects are drawn from photographs, so that they might have been, and ought to have been faithful representations of some of the most delicate and beautiful sculptured detail in existence; but he appears to have thought that no one would notice trifling aberrations of outline, or oversights in regard to the proportion of pattern and ground, so that it was not worth while to take much pains; and the result is that his drawings are little better than caricatures, boldly rendered, but presenting nothing of the fine feeling which is the most valuable part of Italian work. Much better than this are his drawings of the Giraud-Torlonia Palace, and a lot of colonial doorways, Nos. 122 and 123, which are careful and good. Numbers 11 and 12 are in color, the first being a rough, but rather effective sketch by Mr. Taft, of a house which would be likely to be considerably less effective than the sketch, and the second a well-executed drawing of what looks like a parochial school, but turns out to be a Washington dwelling-house. The next number exhibits Mr. Henry Nes as a pen-and-ink draughtsman, in a competition sketch, made for Mr. R. H. Robertson, for the new *World* building, an effort which cannot be called particularly successful in any respect. Another pen-and-ink drawing in sepia, by Mr. Unbert Pierson, is intended to represent the door of Bourges Cathedral, but, like too many others, sacrifices conscientious attention to detail to a dash and effectiveness of drawing which would be tenfold more attractive if it accompanied fidelity to the lovely original. There are plenty of drawings on the walls which are quite as effective, as dashing and as sketchy as this, but which give such facts as they are intended to express with perfect faithfulness, the best among these, next to those by Mr. Kirby and Mr. Bacon, of which we shall have more to say hereafter, being perhaps Mr. Schladermundt's sketch in Venice, No. 88, and Mr. Schweinfurth's frame of little drawings, No. 140, the most careful of which are extremely good.

In No. 17 we arrive at the first example of a tribe of works which is represented in great force in this exhibition — unfortunately for the exhibition, and for those who cherish the idea that architecture consists of something more than colored blots on paper. This is not the worst of the lot, the most glaringly superficial and meaningless of them all, such as Nos. 50, 118, 151, 202, being attributed in the catalogue to that very clever architect, Mr. C. S. Luce. The last one is, indeed, signed, "C. Luce, Pinxit;" the tool used by the "Pictor" being apparently a whitewash brush, with which several puddly dashes of various colors have been slopped together into a sort of outline of a building, on which have been subsequently dropped some little blobs of indigo, which, we suppose, are intended to do duty for windows, although in two instances they appear on the outside of what are evidently designed to indicate chimneys. Of architecture in these works there is little or none. A rectangular wooden box surmounted by a clumsy roof, and furnished with shapeless windows at regular intervals is not an architectural object, even though one end of it may be yellow and the other red, nor does it help it to cloud the middle with green. On the contrary, such veils of chromatic haze would spoil the effect of the best piece of architecture ever designed, and on an ugly barn they simply increase the ugliness.

[To be continued.]

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSES OF MRS. J. J. FRENCH AND MRS. C. E. STRATTON, COMMONWEALTH AVE., BOSTON, MASS. MESSRS. ALLEN & KENWAY, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

STABLE FOR W. F. PROCTOR, ESQ., LORDADA, NEW YORK, N. Y. MR. W. ROSS PROCTOR, ARCHITECT, PITTSBURGH, PA.

CHURCH OF ALL SAINTS, PONTIAC, R. I. MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

PULPIT AND CHOIR IN THE KNEELAND MEMORIAL CHAPEL, TRINITY CHURCH, LENOX, MASS. MR. W. G. BROCKLESBY, ARCHITECT, HARTFORD, CONN.

RESIDENCE OF SENOR ENRIQUE CONCHA Y TORO, SANTIAGO, CHILI, S. A.

COMPETITIVE DESIGN FOR CALVARY BAPTIST CHURCH, DAVENPORT, IO. MR. WM. COWE, ARCHITECT, MILWAUKEE, WIS.

HOUSE FOR JAMES R. WAUGH, ESQ., CHARLTON HEIGHTS, D. C. MR. T. F. SCHNEIDER, ARCHITECT, WASHINGTON, D. C.

HOUSE OF MRS. ISABELLE NASH, BRIDGEPORT, CONN. MR. C. T. BEARDSLEY, JR., ARCHITECT, BRIDGEPORT, CONN.

A GENERAL PROTEST AGAINST IMPROPER CONDITIONS OF COMPETITION.

[Architects in every part of the country are invited to send us their authorization to add their names to the protest. — Eds.]

BOSTON, MASS., December 18, 1888.

THE Commonwealth of Massachusetts has, by its Commissioners, advertised for designs for the State-House extension, said designs to be furnished in open competition. The conditions of the competition, as announced, have evidently been framed without due regard to the best custom in the conduct of such matters, the sole end and aim of which should be to secure to the State the best service by making sure that "the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected; and that the author of the successful design shall be employed as architect, provided the building is built and he is competent."

The conditions announced are faulty —

First. In that they are not drawn up in accordance with the best custom, and no assurance is given that an expert adviser will be employed to aid the Commission in their choice.

Second. That no assurance is given that the successful competitor will be employed, but, on the contrary, it is distinctly stated that all premiated competitors are to relinquish all ownership in their plans to the State, without any further claim to compensation or employment.

Third. Even if the first prize in the competition were as it should be, the execution of the building, the actual prizes offered would still be entirely insufficient compensation to the authors of the drawings placed second and third.

For the above reasons, we, the undersigned architects, citizens of the State of Massachusetts [and elsewhere], protest against this form of competition, which, in our opinion, is not for the best interests of the State or of our profession, and we therefore decline to enter it:

BOSTON, MASS.
Cabot, Everett & Mead.
Wheelwright & Haven.
Joseph H. Richards.
John A. Fox.
Geo. H. Young.
E. A. P. Newcomb.
Longfellow, Alden & Harlow.
Edwin J. Lewis.
Andrews & Jaques.
H. Langford Warren.
Walker & Best.
Wm. Rotch Ware.
Hartwell & Richardson.
Cummings & Sears.
T. M. Clark.
Allen & Kenway.
Rand & Taylor.
Thos. O'Grady, Jr.
Scoggin & Cabot.
Shepley, Rutan & Coolidge.
Rotch & Tilden.
Snell & Gregerson.
Shaw & Hunnewell.

BOSTON, MASS.
Wm. G. Preston.
L. Weissheim.
Franz E. Zerrahn.
Carl Fehmer.
Arthur Little.
Peabody & Stearns.
Winslow & Wetherell.
W. H. McGlotty.
W. M. Bacon.
W. P. Richards.
Daniel Appleton.
H. M. Stephenson.
W. R. Emerson.
Wm. Whitney Lewis.
J. Merrill Brown.
Chamberlin & Whiddan.
Wm. D. Austin.
F. W. Chandler.

HOLYOKE, MASS.
E. A. Ellsworth.
H. Walther.
Jas. A. Clough.
Geo. P. B. Alderman.
Cain & Kilburn.

HOLYOKE, MASS.
Henry H. Gridley.
W. F. Fitch, C. E.
D. H. & A. B. Tower.
T. W. Mann.

LAWRENCE, MASS.
Chas. T. Emerson.

LOWELL, MASS.
E. W. Stickney.
Merrill & Cutler.

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H. W. Rogers.

SPRINGFIELD, MASS.
Gardner, Pyne & Gardner.
Richmond & Seabury.
Jason Perkins.
F. S. Newbiss.
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A. P. Cutting.
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M. P. Hapgood.
W. G. Brocklesby.

NEW HAVEN, CONN.
L. W. Robinson.

WATERBURY, CONN.
R. W. Hill.

WASHINGTON, D. C.
W. J. Marsh.
H. T. H. Windsett.

CHICAGO, ILL.
J. E. O. Pridmore.

BALTIMORE, MD.
T. B. Ghequier.
R. F. J. Johnson.

CEDAR RAPIDS, MICH.
Josselyn & Taylor.

KANSAS CITY, MO.
Willis Polk.

ST. LOUIS, MO.
C. K. Illsley.

ST. LOUIS, MO.
Rauch & Young.
A. F. Rosenheim.

ST. PAUL, MINN.
Gilbert & Taylor.

EAST ORANGE, N. J.
S. W. Whittemore.

NEWARK, N. J.
P. G. Botticher.

ALBANY, N. Y.
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F. H. Janes.

BROOKLYN, N. Y.
C. P. Fismmah.
M. J. Morrill.
H. M. Davis.

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R. A. & L. Bethune.
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Pierce & Dockstader.

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Fowler & Hough.
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Kopster & Wright.
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A. J. Bloor.
J. R. Hirchman.
C. P. Kert.
G. B. Harney.
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G. M. Walgrove.
C. H. Israels.
H. M. Congdon.
Withers & Dickson.

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O. P. Hatfield.
G. M. Hass.
H. O. Avery.
G. W. & A. A. Stoughton.
W. H. Beers.
H. Edwards-Pickon.
H. R. Marshall.
A. H. Thorp.
L. B. Valk.
H. F. Kilburn.
J. A. Hamilton.
W. H. Merserneau.

ROCHESTER, N. Y.
J. R. Church.

SAYVILLE, N. Y.
J. H. Green, Jr.

UTICA, N. Y.
W. H. Symonds.

CINCINNATI, O.
E. Anderson.

PHILADELPHIA, PA.
Smith & Pritchett.
G. C. Mason, Jr.
Moses & King.
F. M. Hay.
B. Linfoot.
J. M. Wilson.
H. A. Macomb.
Cope & Stewardson.
Hazlehurst & Huckel.
J. J. Deery.

PROVIDENCE, R. I.
Stone, Carpenter & Willson.

HEATING AND VENTILATING THE NEW COURT-HOUSE AT BOSTON.

WHERE is no one type of apparatus, no complete system of heating or of ventilating, just as there is no one construction suited to all the varieties of building. Each building has its characteristic peculiarities and special requirements, calling for modifications in the heating and ventilating apparatus. In most cases, even of public buildings where ventilation is of paramount importance, the selection of the apparatus is likely to depend upon its possessing some one feature perhaps of great excellence in itself, but not necessary in any sense to the attainment of the result supposed to be peculiar to it, and not having a single one of the elements essential to producing the effects most appropriate and desired. These may have been taken for granted or overlooked altogether, because overshadowed by the undue prominence accorded to some detail of really secondary importance. It appears in this case as if the Commissioners, believing a certain type to be generally excellent, and having been shown some actual examples, impressive from their very magnitude (for that reason perhaps) had forthwith adopted it for the court-house.

Beyond the care shown in the preparation of the plans, for whose completeness the engineer deserves the highest praise, we think magnitude and the lavish use of iron in almost unlimited quantities, cast, wrought and galvanized, constitute the only merits of the design, if indeed it be a merit to cram the valuable space of a costly building with useless material, of which the whole excess is in fact, nothing but junk.

We propose to investigate the subject of heating and ventilating this building somewhat exhaustively, and, having determined the elements which should indicate the design, see to what extent they have had influence in the plans of the court-house apparatus. It is first essential to examine the conditions depending upon the construction and arrangement of the building, and, considering the use to which it is to be applied, to fix the requirements in accordance with established principles and within the capacity of modern engineering.

These data being ascertained, the next step is to design an apparatus that can, with least first cost but greatest permanence, most nearly attain the results aimed at, doing this with economy in fuel and maintenance, and ease and simplicity of management.

The degree of excellence which the apparatus will possess will depend upon the thoroughness with which the conditions and the requirements have been studied in all their aspects, the resources of the designer and his skill in securing indispensable results notwithstanding obstacles and unavoidable restrictions.

The apparatus should be capable of such a variety of effects as to set at nought the caprices of wind and weather, but the effects will not be secured if the means of producing them are lost in a multiplicity of details not readily accessible and scattered over a wide area. The arrangement should favor a reduction in the number and a gathering together of parts and making the details conspicuous, tending to concentration of management. A great number of parts,

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No. 651. American Architect and Building News, Jan 12 1889.

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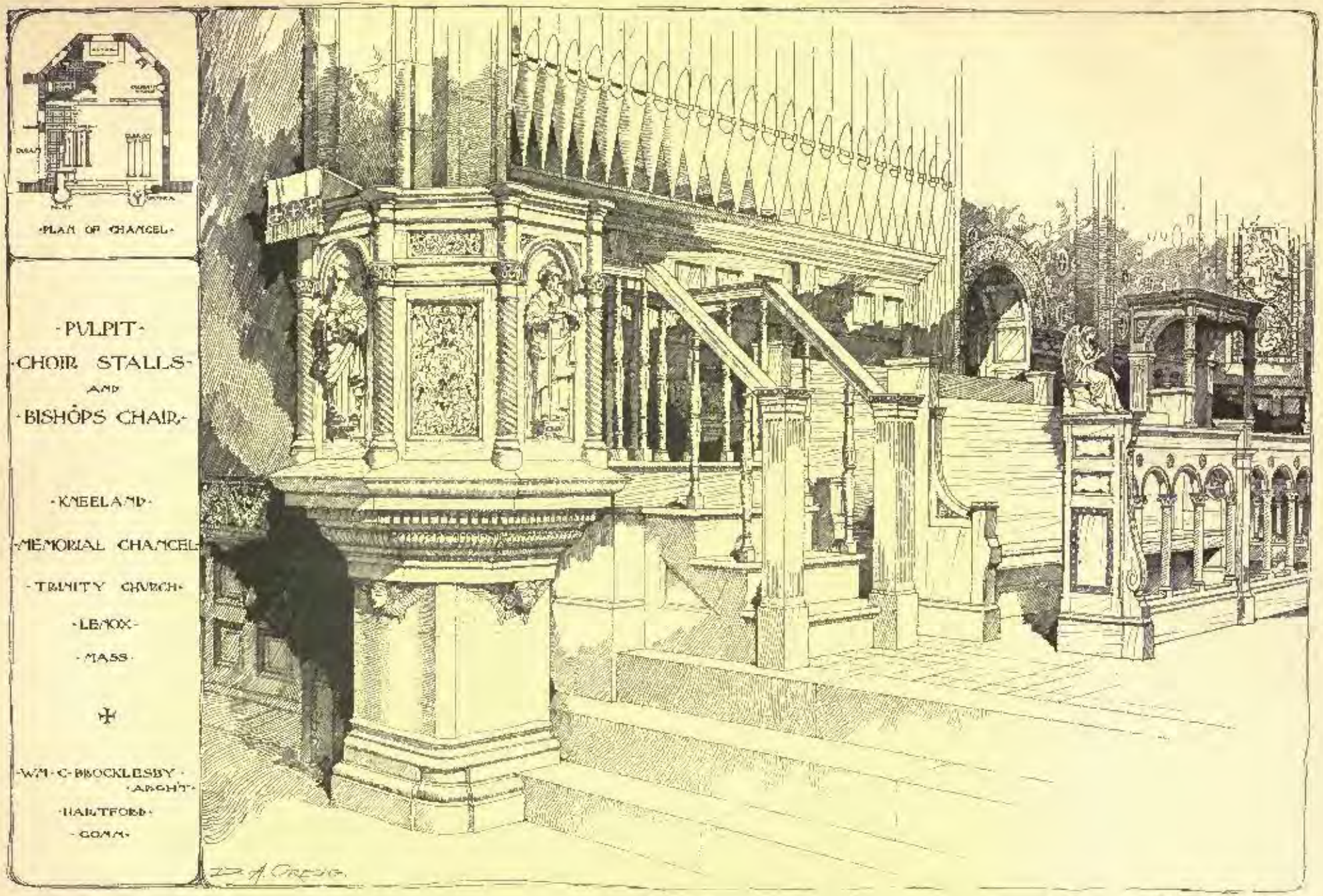

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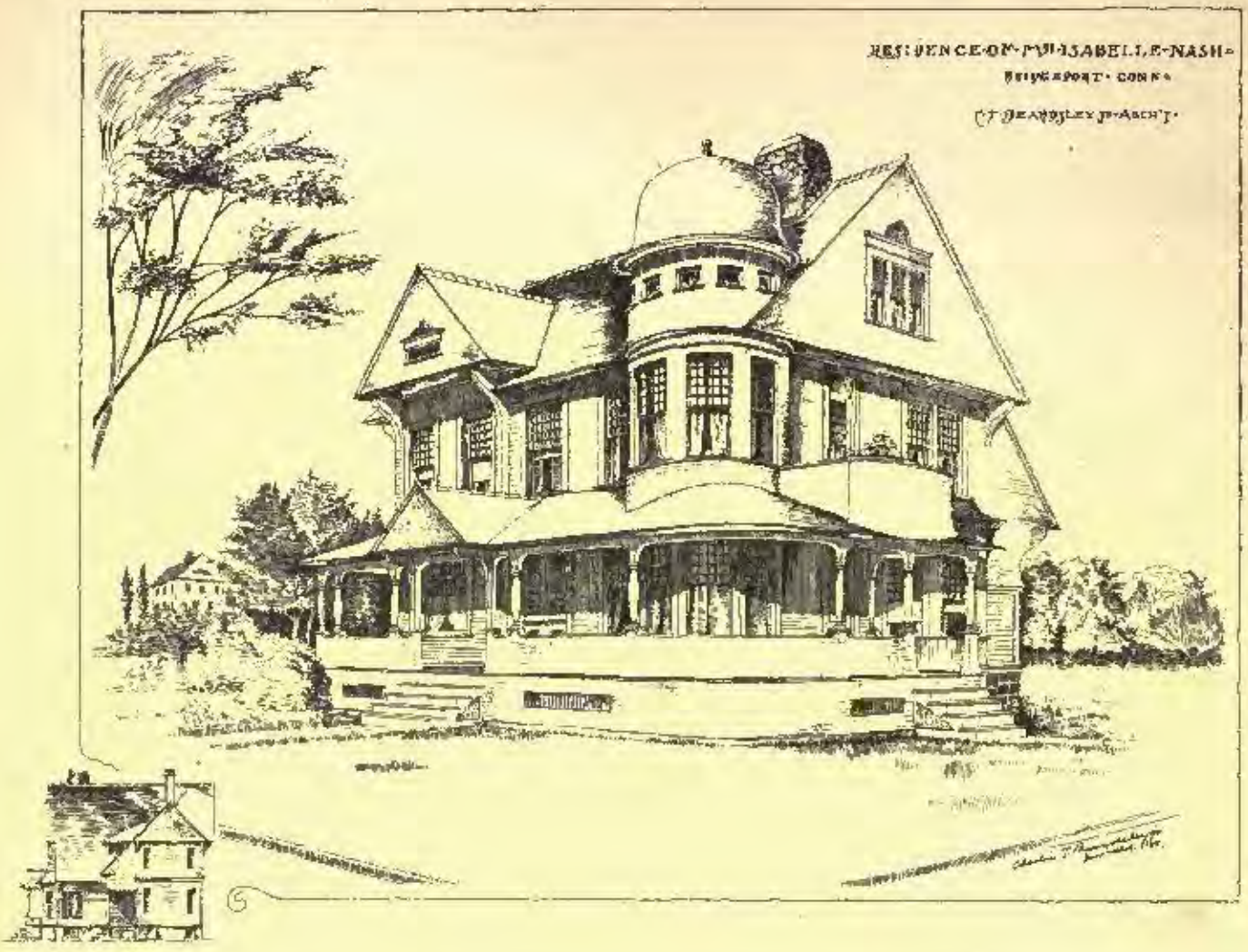

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ALLEN & KENDALL, Architects.

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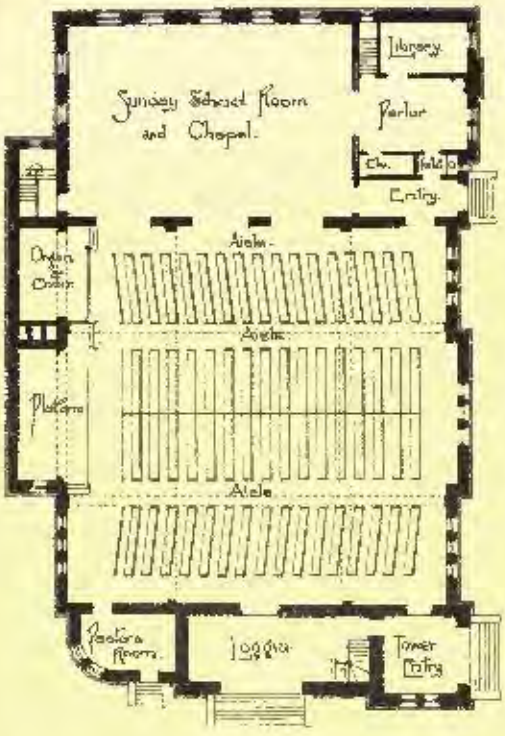
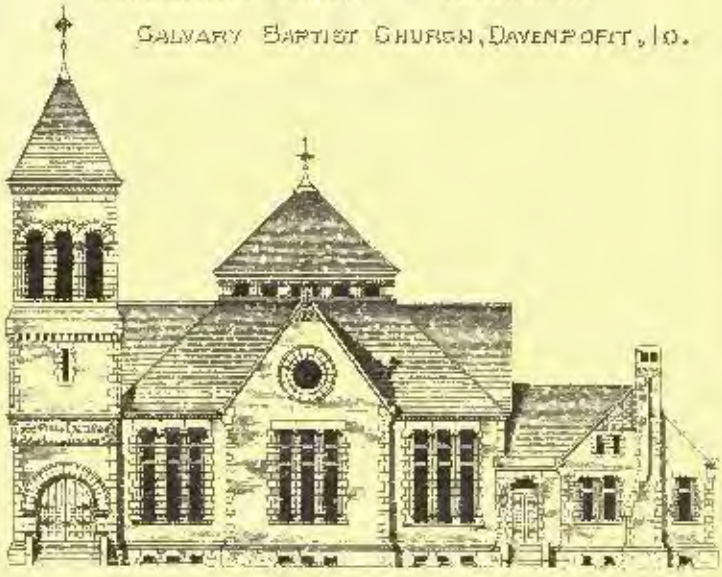
COMPETITIVE DESIGN — ALTERNATIVE

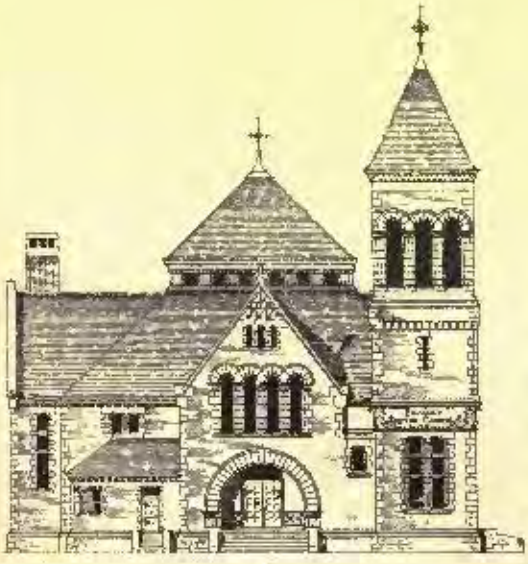
GALVARY BAPTIST CHURCH, DAVENPORT, IO.



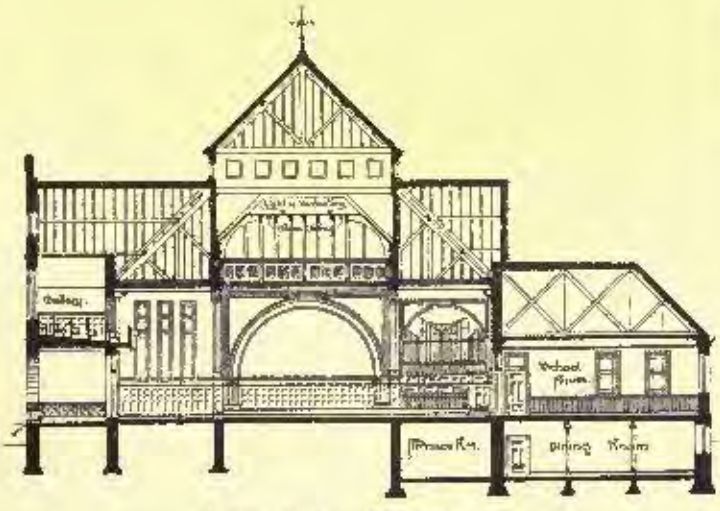
PLAN.



SIDE ELEVATION.



FRONT ELEVATION.



LONGITUDINAL SECTION.

W. M. Cowe, Architect, Manchester.

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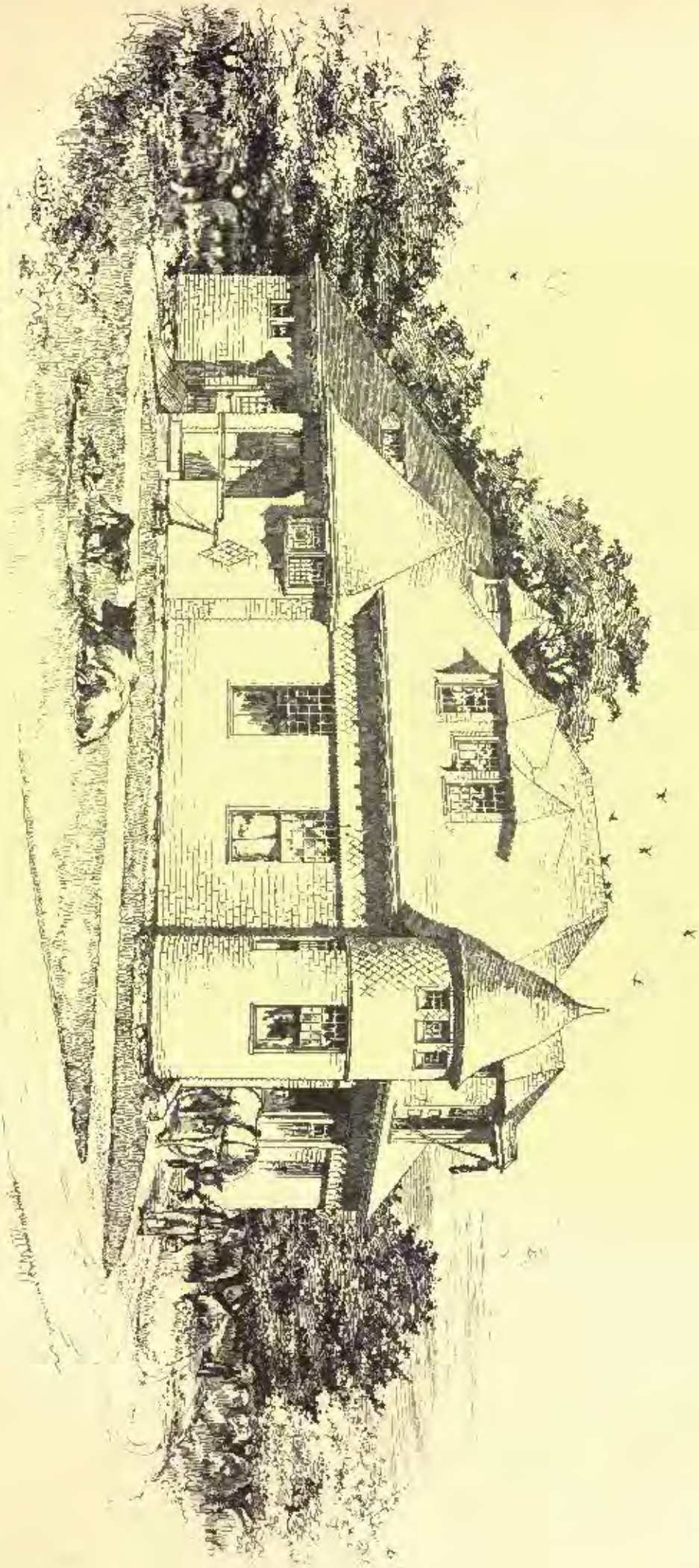

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LOUISIANA, NEW YORK, N.Y.

WM. ROSS PROCTOR, ARCH'T.

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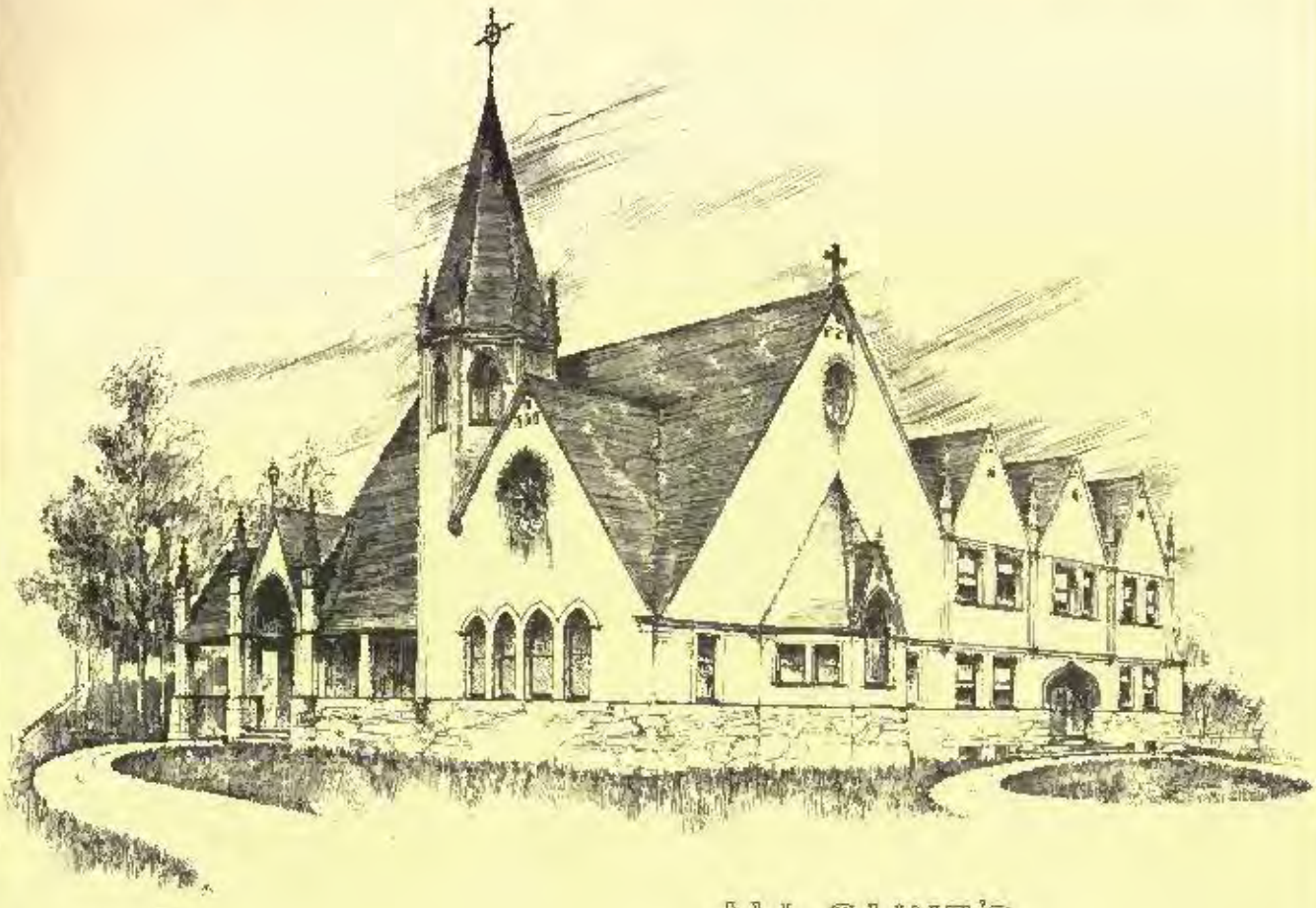
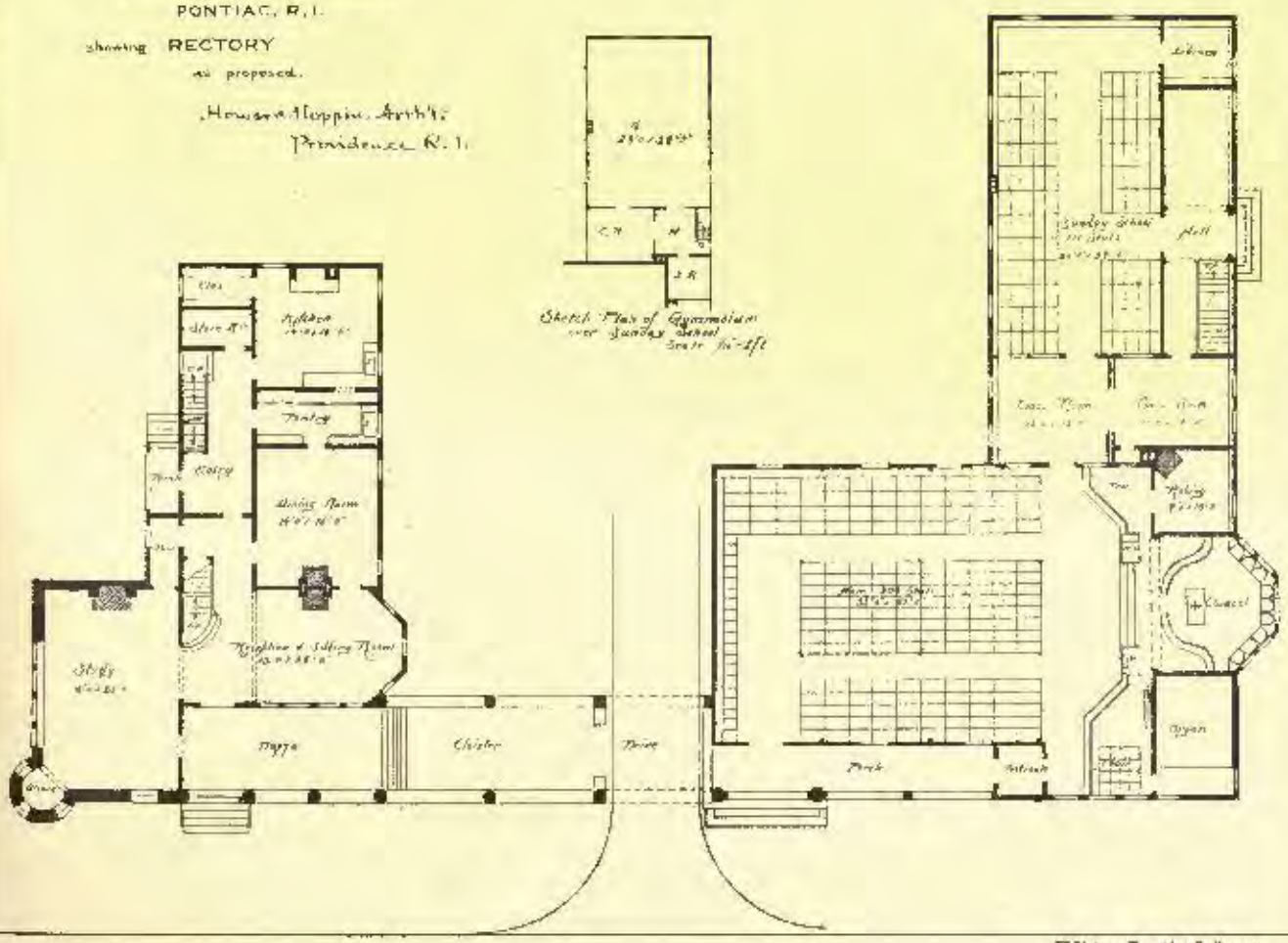


ALL SAINT'S.

PONTIAC, R.I.

ALL SAINT'S CHURCH.
PONTIAC, R.I.
showing RECTORY
as proposed.

Howard Hoppin, Arch't.
Providence R.I.



Heliotype Printing Co Boston.

either similar or different, involving endless repetition of adjustment, incites confusion. The control of all those elements from whose flexibility proceeds the adaptability of the apparatus to changing conditions, should be judiciously concentrated, and the operation of each part and the whole together be responsive to it.

It must be taken into account in the first place that there will be machinery to be run by steam-power; half-a-dozen elevators and possibly electric-lighting besides. Therefore a considerable amount of steam-generating power is required. Now, it is an important fact that the heating effect of the exhaust steam of engines, though less intense, is equal in quantity to that of live steam. Compared with live steam under pressure it is theoretically not exactly so, but substantially and practically no difference can be detected without the greatest nicety in the measurements. The significance of this is that a large element of economy may be availed of by utilizing this waste steam for heating.

There are two modes of transferring heat from a central source: in one, the heat conveyed by water or steam in pipes is liberated from the surfaces of radiators set in the spaces to be warmed. In the other, the heat is transferred by a current of air, which also may subserve the purpose of ventilation.

As between the two methods the latter is justly believed to be the more desirable, because with the heat there is supplied a continuous flow of fresh air.

In those cases, however, where a rapid change of air is of no consequence, this form of heating is needlessly wasteful. Let it be understood that if the temperature is to be kept at a fixed point, say 70°, the entering fresh hot air must displace an equal quantity at that temperature, whose heat is thus carried away by the outlet flues and lost.

The average winter temperature is near 32°; now if the air is taken into the heating apparatus at this temperature and heated to a point high enough to maintain the building at 70° (which is therefore the temperature of the air thrown away), then the loss by this system is measured by the quantity of air raised from 32° to 70° and continuously discharged. Supposing the air in this building to be changed once in fifteen minutes as would be the case with this unmodified system, the loss would amount in the case of the Court-house to the combustion of 571 pounds of coal per hour more than would be required to maintain the temperature of the building, and in cold and windy weather this loss would be disproportionately increased, owing to accelerated velocity in the flues, and consequent excessive flow of air.

The system, in mild weather when unlimited ventilation can be afforded, is almost stagnant; on the other hand, when severe cold indicates a restricted supply of air, the flow is excessive, and the apparatus is taxed far beyond the just needs of the building for both heat and fresh air. The use of the building will be such that a change of air need only be maintained during eight hours of each working-day; therefore during two-thirds of the time at least, change of air is not necessary.

It is plain then, that economical considerations demand that the heating should not depend upon the supply of fresh air; that the building should be kept warm by direct radiation, and that the air should be supplied in proportion to the demand for ventilation, sometimes more, sometimes less, and only heated to 70°. Being freed from the duty of transferring heat (except so far as it should be suitably warmed for introduction into inhabited apartments) the air-supply can be brought under exact control and the ventilation can be adapted to actual needs, be increased, diminished or stopped altogether, without in any way affecting the heating or being itself affected.

Thus the heating can be suited to the exigencies of the weather and the ventilation to the wants of the occupants, without interference. But if the two are inseparably connected, the joint apparatus will be worked chiefly with regard to the heating, which is indispensable, and the ventilation, as being of less importance, will be inevitably sacrificed and finally lost sight of altogether.

Next, as to the modes of heating: We have to decide between hot water and steam. It is important to cover a considerable range of temperature, and to secure flexibility or promptness of action. Of the two, the former is more important. Water-circulation affords a complete range of temperature, so that every variety of weather can be perfectly met. On the other hand, it is slow to change its temperature. Steam is much more quickly turned on and shut off, but acts within narrow limits. The radiating-surfaces, being calculated for the coldest weather, are excessive for all other times. As a rule, steam-heated buildings are too hot in mild weather, and not always warm enough in extremely cold weather; there is no provision for extremes, yet it is the extremes of weather which it is the very province and intention of a complete system to meet and nullify. No device for regulating the heat of steam-radiators has yet come into general use, and, in spite of the greater slowness of action, we must accept the hot-water system on account of its wide range of temperature. But there is another property of steam which we may make use of, which will enable us to save the waste steam of engines, and to secure a great economy of space and apparatus in the transfer of heat from the heating centre to the local heaters. We have found that we should use hot-water radiators, but it is not therefore necessary that the water should be heated at some remote point, and thence be slowly transferred to the distant radiators through ponderous pipes. The radiators can be heated locally by brass coils supplied with steam, and placed within and acting upon the water system at the base of the rising mains. Nothing can exceed the rapidity with which steam can transmit heat at great horizontal distances through pipes of but moderate dimensions, and with but slight loss of pressure and reduction of intensity. Next to its use in driving engines, this, the transfer of heat in great quantities economically, is its most valuable property, and we must not neglect it. There need be, then, no separate system of hot-water boilers, but only one type of steam-boilers, useful alike for power and heating, thus saving one set of fires.

We can take up next, having settled the heating, the question of fresh air, its quantity, distribution, and control.

The purest air contains 3 parts of carbonic acid per 10,000; in cities, the air contains 4 per 10,000; all agree that the air is still agreeable when it contains 6 per 10,000.[1] The amount of carbonic acid in the breath is about 5 per 100, besides other impurities of which it is the measure, or 100 times as much as in air usually thought fit to breathe. The quantity of air consumed by one man in an hour is less than 18 cubic feet, producing on an average 0.6 cubic feet of carbonic acid; whence, to keep this from increasing above 6 per 10,000, it is necessary to supply not less than 3,000 cubic feet per person per hour.[2] This must be the limit for small rooms, for the jail and the library. For crowded court-rooms, a greater degree of vitiation will have to be accepted, if not by the judge and jury, certainly by the spectators, for causes largely owing to themselves. But the air need not be so bad as to be noticeable, except to one coming in from the fresh air out-of-doors.

The supply of air should be proportionate to the number of occupants of the rooms as nearly as can be estimated, and provision should be made for increasing or diminishing this supply by simple means, and without affecting the heating.

Where the so-called indirect system is used, the only way to lower the temperature is by shutting the registers, and thereby arresting the ventilation, or by opening the windows and pouring cold air down the backs of the occupants; or, where a system of mixing-dampers is used, while there may be an approximate, but practically very imperfect, control of temperature, there is no control of the air. So, too, if there are numerous inlets for the air, the supply will be most irregular. Sunday, when the building is empty, it may be flushed with deluges of air pouring in from a hundred openings exposed to a furious gale; Monday it may be calm, and the ventilation inactive when the house is crowded. If there are dampers for the engineer to adjust when the wind is northwest, he can change the position of them all when the wind is southeast. At the next change of wind he will probably close them altogether, and take fresh air from the cellar, as is done in most of our city school-houses. There can be no system and no regulation under such conditions. The flow and quantity of air can be regulated and controlled by air-propelling machinery only, and should not be left dependent upon the accident of wind, or the manipulation of hundreds of dampers by several hundreds of people scattered all over an immense building, and acting without knowledge or agreement with each other. It is evident that a systematic ventilation demands effective means to regulate and control both the temperature and volume.

Besides the temperature and volume, the moistness of the air must be considered. Air contains the vapor of water at all temperatures, but its capacity for absorption increases with the temperature. For example, at 32° one cubic foot of air can hold two grains of water, while at 70° it can hold eight grains, although, being expanded by heat, it weighs less. But in natural air it is only at times saturated, its mean in this climate being 71 per cent of saturation, in England 81 per cent, while it varies between the unusual limit of 30 per cent, or extremely dry, and 100 per cent, or saturation, when it either rains or snows.

If we take air from out-of-doors at 32° and at 70 per cent of saturation, called its relative humidity, and heat it to 70° without adding water, having about 1.4 grains to start with, the warm air will only have about one-sixth of its capacity for water supplied, or 17° of humidity. This is not because the heating process has dried it, as is commonly supposed, but because, by rise of temperature, the power to absorb water is enormously increased. Air as dry as this is very disagreeable to many people; whether it is hurtful or not is an unsettled question. But it would appear that Nature would be a safe guide in the matter, and, if we moisten somewhat the air which we heat, we should only do what Nature does on a large scale. Here, again, we are restrained by practical difficulties. If the moisture is abundant, that is, if the relative humidity is high, the dissolved vapor will be precipitated as dew on cold surfaces, just as we see it in summer on pitchers of iced water. If the temperature of the inner surface of a pane of glass is 45°, and the temperature of the inside air is 65°, moisture will just begin to condense on the window-glass if the air is at 50 per cent relative humidity. There is no objection to this except in the case of exposed iron skylights, where condensation and dripping might be troublesome. Experience shows that the relative humidity may be kept up to 50 per cent in this climate, except in the most severe cold weather, without inconvenience practically, and with great comfort to many people.

Since the greater part of the time is spent indoors in winter, the question of moisture probably has an important part in the effects of the climate in this country, and more attention will hereafter be paid

[1] Angus Smith.
[2] Dr. Parkes.

to it. Where there is no ventilation, of course there need be no moisture provided, and it is only as ventilation becomes more prevalent that the subject of humidity will receive more consideration.

Its bearing on the climate is already being investigated, while its influence on the weather has long been established; but, as to climate, it is somewhat obscured by the other influences of temperature and sunshine, and not much knowledge has yet been reached. It is known, however, that the climate of Florida and of many other places much sought by invalids is moist; Nice has a humid climate, but at times, in spring, is almost intolerable, owing to the excessive dryness of the atmosphere. This dryness, which also prevails in spring in some localities on the coast of New England, is to this day popularly supposed to be a dampness, from its chilling effects, but repeated observation has established the facts as above explained.

Evaporation produces cold, because each little atom of vapor carries off with it a quantity of heat, and a dry air chills by its rapid absorption of invisible perspiration. To avoid chill, dry air must be rather warm; it should have a temperature so high as not to remove much heat from the body beyond what is carried off by the evaporation. A dry air at 80° is not too hot for many persons. If the cold produced by evaporation can be avoided, it is plain a lower temperature would suffice, and it is probable that a moist atmosphere at 62° would have the same effect on our sense of heat as a dry air at 70° or more, and is desirable for many reasons. The blood is not able to furnish an unlimited supply of water for perspiration, and probably the injurious effects of a dry atmosphere will be found to consist in such a rapid evaporation from the skin, while the body is at rest and the circulation slow, as to diminish the proportion of water in the blood of smaller vessels faster than it can be replaced by the circulation. This explanation is plausible; but, after all, exposure to dryness may cause no permanent harm, though to many it is a source of momentary discomfort.

The usual way of supplying moisture is by rapid boiling from a pan or hot surface. There are some objections to this, because the water contains organic matter and dissolved gases, some of which are decomposed and set free by boiling, and impart a smell to the air. There will be, however, a residue which is not driven off with the vapor, and which, by slow accumulation, makes the water very foul. Both of these objections are obviated by evaporating the water at a relatively low temperature, and by allowing it to flow through the evaporator in a constant stream, only three-quarters of it being evaporated. This part of the heating apparatus ought to be placed where it can be frequently inspected and seen to be in working order.

Having now considered the ruling elements with sufficient fulness to be able to outline a plan, and summarizing the results, we find that economy and efficiency require that the main heat-distributing system should be worked by steam; adaptability to regulation through a wide range of temperature determines that the local radiators should be warmed by hot water, which, as shown, ought to be arranged in detached circuits deriving their heat from a steam apparatus centrally placed; that systematic and regulated ventilation cannot be had without a mechanical propulsion of the air which should be susceptible of complete control at one point; that for the sake of comfort, the relative humidity of the heated air should be kept up, and, since this is evidently impracticable if the fresh air be admitted at many points, we have another reason for concentrating the entire control and treatment of the air in such a way that system in the management, prompt adjustment and regularity of working may be assured. We now know exactly what is requisite, and the proper means to obtain it. The question is, are these means within the reach of the architect and the Commissioners, and if so, have they availed themselves of them?

There are numerous examples in our own country as well as in Europe where these principles have been applied with complete success; where the apparatus was designed by engineers who not only appreciated all that is demanded by good ventilation and understood clearly what they were aiming at, but possessed the skill to so utilize their resources as to hit the mark with certainty. It is true that many of these examples are impaired by want of money, for none of them had the friendship of Government officials and a Government surplus to draw upon.

Before examining the proposed plans to find an answer to these questions, it would be instructive to determine for ourselves the quantities and the power of a heating apparatus suitable for this court-house.

The contents in cubic feet are 2,095,000 divided as follows: in rooms, 1,468,000; library, 132,000; corridors, etc., 1,095,000.

The area of external walls is in square feet 148,000; and of glass in windows and skylights, 25,800. Our figures are approximate.

The average loss of heat at internal temperature of 70° and external, 32° (the average of our winter climate), will be, according to Péclet and Box, per hour,

by walls, 148,000 sq. ft. at	8.3	units of heat	U 1,228,400
by windows, 25,800 sq. ft. at	19.75	" " "	509,600
by leakage of air, 200,000 cu. ft. at	0.64	" " "	128,000
Total loss of heat per hour in heat units,			1,866,000

Allowing that one pound of coal by its combustion yields only 8,000 units of useful effect, and dividing by this number the above total, we have the loss per hour measured in fuel to be 233 pounds of coal. This is the average loss. At 6° below zero, the loss would be double this, or 466 pounds if the cold should be continuous. But in this latitude, the cold seldom reaches so low a point and never remains there long, moreover, a massive building is not readily penetrated by it, so that if we provide for such a degree of cold, with an apparatus capable of meeting this extreme loss of heat we should have ample power and something over.

We have not considered the cubic space for the reason that it has no fixed relation to the loss of heat. It may help us to determine the quantity of ventilation.

If we change the air in the corridors twice per hour we have

	1,095,000 x 2	= cu. ft.	2,190,000
in the rooms, 6 times,	1,468,000 x 6	= "	8,808,000
in the library, once in 40 minutes,	132,000 x 1.5	= "	198,000
Total hourly change of air, cubic feet,			11,196,000

Or 186,600 cubic feet per minute.

The hourly consumption of coal to heat this air from 32° to 70° will be $\frac{11,196,000 \times 0.07. \times 0.24 \times 38}{8,000} = 893$ pounds, and the quantity at 6° below zero would be double this, or 1780 pounds.

The average heating effect then calls for the combustion of $233 + \frac{893}{3}$ (the ventilation being carried on only one-third of the time, eight hours in twenty-four) or about 530 pounds of coal per hour.

The maximum effect, which indicates the power of the apparatus, calls for 466 + 1786, or curiously enough, about 2240 pounds per hour. This is an extravagant provision, because it is very improbable that all the rooms will require full ventilation at the same time, and since at 6° below zero, the quantity of ventilation may be reduced somewhat, as in fact it always is, even sometimes to the point of shutting right all cold-air inlets. But we intend to be liberal to extravagance, so that we cannot be accused of suggesting less than the real requirements of the case.

Above we gave some figures showing the quantity of air required per person for good ventilation to be 3,000 cubic feet per hour. In our arbitrary rate of change, we allowed for 11,196,000 cubic feet per hour, consequently we have provision for adequately supplying fresh air for $\left(\frac{11,196,000}{3,000} =\right)$ nearly 4,000 persons when the thermometer outside is at 6° below zero. This is more than generous.

The boiler power to fully convert into useful heating effect the above extreme and improbable use of coal is that of about 288 horses, reckoning a maximum combustion of 10 pounds per hour per square foot of grate-surface, and an evaporative efficiency of only 7.7 pounds of water per pound of coal, or 6 boilers of 48 horse-power each.

As we intend to utilize the exhaust steam of machinery for heating, we need make no provision for power, simply leading the steam to the engines before using it for heating, and thus getting the elevating and lighting-work done for nothing.

To transmit this heat by radiation from surfaces at a moderate temperature agreeable to the occupants, calls for about 12,400 superficial feet of radiating-surface in the local heaters whose duty it is to maintain the temperature of the building, and for heating the air distributed for ventilation, a central coil of pipes, containing about 8,000 square feet, very compact and efficient.

For moving this air, one fan about 14 feet in diameter running at 100 revolutions per minute and an engine of 30 horse-power would be required. Two smaller fans and two engines would be better, forming a duplicate apparatus, and there ought to be a separate fan for the jail. In the system here outlined, if the heating-plant should be disabled, the heating could be continued by the power-plant and ventilating-apparatus, and vice versa, and the business of the courts need not be interrupted.

To have sufficient power even above the improbable maximum demand, we should increase the boilers by one-third; as the radiating-surfaces may be subject to disadvantages of location, arrangement or construction (such as being massed too much together) we should increase them liberally, and also provide a surplus so that if the building should have become chilled, the apparatus can recover the lost ground rapidly. Let us double the heating-surfaces: We now have 6 × 1.33 = 8 boilers of 48 horse-power, and 12,400 × 2 = 24,800 square feet in radiators and 8,000 square feet in the main coils for heating fresh-air, making a total heating-surface amounting to 32,800 square feet. We also need three blowing-fans, with their engines, to force the movement of fresh-air, evaporators, and probably three fans to insure positive movement in the ventilating-flues if they are tortuous and very unequal in length and frictional resistance. The exhaust-fans should be run by electro-motors. It is to cost nothing for power to run these fans. There should also be a small fan to expel heat from the boiler-room in the summer, to prevent it and the odor of hot oil from machinery from passing into other parts of the building.

These, then, are our estimates of the boiler and heating power required by the Court-house, and arrangements similar to those we have described for insuring the ventilation we think not only desirable but indispensable to a good result.

We have only sketched an outline, but, in general, our apparatus, besides being capable of the effects which we stated to be necessary at the outset, and which we think will command unquestioning

assent, would possess this important quality, the entire control of temperature by the occupants of the rooms or persons in charge of them, without reference to the ventilation; there need be no opening or shutting of registers in attempts to regulate the heat, and no uncertainty in the supply and removal of air. If it should be too hot or too cold, the remedy is in operating the local radiators; but the ventilation should and could go on absolutely without reference to temperatures in the building, for, as stated among the essentials in our enumeration of the effects to be obtained, this air would be delivered in all parts of the building at a constant temperature, say 70°, which, if the rooms were colder than that, might add to their heat up to that point, but could by no means make it greater. Thus the engineer's duty would be extremely clear and easy for him to perform; and if the control were properly concentrated, he could have no excuse for unsatisfactory results anywhere.

We are forced to admit that in many cases neither has the managing engineer any clearly defined duty beyond keeping the building as hot as he can, nor the means of doing much else than this.

We believe that our conclusions cannot be shaken by any evidence obtained from the actual use of any type of apparatus; on the contrary, that it is founded on correct principles and supported by the best experience and practice the world over, except in Great Britain and districts controlled by the architectural bureau of the United States Treasury Department; that it is strictly in line with modern progress, and within the capacity of modern engineering.

Let us see to what extent the proposed apparatus is conformable to them.

The Commissioners' engineers specify (12 hot-water and 2 steam =) 14 boilers of 45 horse-power each; about 30,382 square feet of direct and 57,240 square feet of indirect radiators, or a total of 87,622 square feet of heating-surface, besides a large amount in ventilating-flues designed to insure a draught. There are no fans. There is no provision for moisture; no utilization of exhaust steam for heating. There are no less than 195 cold-air inlets exposed to all points of the compass, to be operated, in addition to as many sets of valves under varying conditions, by an indefinite number of occupants of the rooms, of whom there is no guaranty that a single one will be an expert in ventilation. There are 74 cold-air dampers, 32 switch-dampers and 64 mixing-dampers, all to be operated at every change of wind and temperature by the efficient corps of supernumerary engineers under the supervision of a skilful chief, probably a graduate of the Signal Service of the United States Treasury Department, who will issue hourly bulletins, with maps, indicating the probable climate for the ensuing hour in various parts of the structure, for the guidance of his subordinates and consolation of the inmates. Far from centralizing the control, the care of all these confused and differing subdivisions is scattered all over the building in dark, inaccessible flues, ducts and tunnels obstructed by enormous pipes, and all this mass of material, the larger part of which must, on account of its unsuitable arrangement, remain forever inert and worthless, is to be buried up in masonry, in whose construction 600,000 bricks are actually specified to be consumed, besides many tons of cast and galvanized iron.

A large part of the apparatus is exposed to certain damage from freezing in case of neglect to manipulate the valves and dampers properly; and it is so built-in within walls and metal casings as to make the repairs resulting from such accidents very costly and annoying.

The main pipes are to be covered with felting of cow's hair, which, after a year or two, will be rotten or moth-eaten;—some of this is in the fresh-air ducts, where it will contaminate the air.

As to the excessive boiler-power and the enormous surplus of heating-surface, it won't do to try to substantiate the correctness of the estimates by reference to Government buildings. In these it can be shown that the power of the apparatus is so far beyond the requirements that large quantities of material have been from time to time removed, and much more is never used, that in none (except where improved methods have been added) is there any systematic ventilation; that in many the cold-air inlets are permanently closed, and where the dampers fit imperfectly, paper is pasted over the registers or screens to prevent the wind from blowing documents off the tables and desks, the heating-power being so excessive as to heat sufficiently through the casings with the open-work screens thus closed.

In the Government buildings in New York and Boston where this system is used, these dampers are all permanently fastened up; some of the outer gratings have been closed by solid plates of cast-iron; in the Boston Custom-House, where a new apparatus of similar design has recently been placed, the wind blows straight through the building, in at one side and out at the other, carrying away out-of-doors heat intended for warming the interior, and, unfortunately, not available for heating neighboring buildings.

The same unsystematic arrangements for supplying air have been inflicted upon most of the Boston public schools, largely under the administration of Mr. Clough, the Court-house architect. Out of many reports made by sanitarians and health-inspectors upon the condition of these buildings, we select the most recent, of which the following is a part, by a prominent authority:

"From the reports of the inspectors, I fail to find the standard reached even in the best-ventilated buildings of the city of Boston; and in a large number of the older buildings (especially those occupied by the primary department of the school) the deficiency is startling, the condition of air being such that no test is required to prove its unfitness for respiration, and danger to the teacher and pupil occupying the building. In many buildings we find no provision even for fresh-air supply, and in others the supply is through the cold-air boxes leading to furnaces, where, as a rule, they are entirely inadequate, and not infrequently are partially or entirely closed. In the class of buildings heated by steam, by what we call the indirect system, we find the best provision for air-supply; but even that, with scarcely any exception, comes far short of the standard adopted, and the supply for the different rooms is irregular, and materially affected by the condition of the temperature and wind outside. A very general and almost universal deficiency is in the size of the fresh and foul air flues, which are found so small as to require a very high velocity in order to accomplish the necessary work. To illustrate, it is rarely that we find more than two supply-pipes to a room, and these are not over fourteen inches in diameter. To get the amount of air required for fifty-six pupils through these pipes would call for a velocity of 1,309 feet per minute, which is not obtained. The same deficiency exists in the foul-air flues, and it is not infrequently the case that the inspectors have found no movement of air whatever in these flues."

To return to the Court-house plans, we assert that they contain no internal evidence of careful study of the conditions, or of design to effect a single result beyond the certain overheating of the building. In fact, we can with difficulty refrain from the thought that the only design is to effect a sale to the County of a vast amount of material, leaving to accident all the essentials of comfort and health, to obtain which these Commissioners were appointed, and for which mainly the edifice is to be constructed. Certainly, without them, no perfection or magnificence of architecture will be a compensation.

Perhaps, as the county has gone so far as Baltimore and Washington for a *type* of apparatus, we may go still further for evidence to prove its worthlessness. It so happens that there is an example of the greatest historical value, which has established for all time the comparative merits of the accidental system of ventilation which our Commissioners have adopted and the designed and regulated system which has alone yielded positive results. We refer to the Hospital Lariboisière (du Nord), in France. About 1848, the commission having charge of the construction of this hospital accepted without competition plans for heating and ventilation prepared by an influential house in the trade. Fortunately, the Council of Administration of Public Assistance of the State vetoed this arrangement, and required the commission to obtain a report by competent experts upon the proposed plans, together with other propositions from parties of high reputation as engineers. The examining experts reported unanimously in favor of one of the new plans, but the commission, under pressure from high quarters friendly to the former proposers, decided to give one-half of the hospital to them, and one-half to the successful competitor. Both apparatuses were finished in 1854, and began work the following year. In the third volume of "*Peclet's Traité de la Chaleur*," edition of 1861, will be found forty pages of matter devoted to this hospital, containing the able writer's own criticism upon the several plans, and embodying the report of M. Grassi, pharmacist resident at the hospital. In this report, the results of accidental ventilation compared with regulated ventilation are fully set forth in tabulated statements compiled from careful observations regularly repeated and continued, and confirming, after extended use, the views of the Board of Engineers who had reported unanimously in favor of the mechanical system of MM. Thomas and Laureus, amended by M. Grouvelle's hot water apparatus, wherein the local hot-water heaters were joined in short circuits heated by steam. This brilliant idea had already been successfully applied at the great Mazas prison.

The latest example of this kind of work which we have seen is that at the Hôtel Dieu (City Hospital), Paris. In this immense institution the entire heating and cooking are done by steam from two boilers of about 50-horse-power (we speak from memory), the hot-water radiators being run by steam-coils. The two main pipes are of copper beautifully fitted, all angles being turned by arcs of circles of long radius. They appeared to us not over three-and-one-half or four inches in diameter. Those in the Suffolk County Court-House are proposed to be thirty inches in diameter.

We confess that the heating effect of an apparatus in Paris should be considerably less than here, and that there is no hospital in France (except those which are ventilated by windows kept permanently wide open, as in England also) which is adequately ventilated. We believe this to be due to the extreme economy of the French people, and to the fact that until the recent researches of Dr. Angus Smith and Dr. Parkes in England, and Professor Pettenkofer in Germany, the quantity of air needed for good ventilation was not appreciated. The apparatus of the French engineers has not failed to yield the calculated results. If there still exist deficiencies, they are due to the real requirements not having been known and stated in the first place, as we, from later knowledge, are able to state them now.

Another great building, the Hôtel de Ville in Paris, of which we have examined the heating and ventilating plans, but which was not complete at the time of our visit, is ventilated also by the mechanical system, the local heating depending upon steam-radiators so constructed as to retain the water of condensation in very large quantity, thus gaining the supposed advantage of a reservoir of heat remaining in the water after the steam is shut off, and utilizing this property of the hot-water system, apparently in the mistaken view

that it is the most valuable one. In our opinion, this is a decided defect in a heating apparatus, and the very and only objection to hot-water heating.

Péclet, the greatest investigator, and, at the same time, highest practical authority on heating, prefers steam-heating, pure and simple, with mechanical ventilation, to all else, owing to its rapidity of action, and when a great range of pressure is permissible, to its corresponding range of heating effect. But later experience goes to show that there are objections to using high pressure in steam-heating, and, consequently, its action is confined within narrow limits. No way of imparting to hot water the quick action of steam, or of constructing a steam-apparatus possessing as great a range of temperature as hot water, has yet come into established use. Either system would be perfect with the attributes of the other, but the world yet waits for their successful union in practice.

Regarding the Johns Hopkins Hospital, which the Commissioners visited, and where the basement is crammed with apparatus for heating and ventilation, and where, if they were merely in search of something calculated to astonish by magnitude and quantity, they certainly found what they were looking for, it should be told that the apparatus (fans and all) was confessedly experimental. The physician who is supposed to be responsible for it, though a learned and able writer and student, not possessing the knowledge, training, or experience qualifying him to design a practical apparatus, arranged with the Commissioners' firm to furnish one on a ten per cent commission, he making suggestions borrowed from books and observations of travel. It is plain to see that both parties to this contract were interested in multiplying the real requirements by some factor, the doctor's being a factor-of-safety (to him), and the contractor's a factor-of-profit.

For doing this work and that of the Government buildings, which by influence (the chief motive power in Washington) are alleged to have been turned into the hands of the same firm which the Court-House Commissioners have employed, many costly patterns and special fittings were required. It is claimed that many of these specialties are called for in the plans for our Court-house, and that the firm who prepared the plans have thereby handicapped all competitors against them for the work by a preference amounting to many thousands of dollars in their own favor. This would seem to have some color, for the reason that some very desirable fittings purposely designed for water-heating, and increasing the efficiency of the circulation, but not handled by this firm, are not specified, named, or shown in the plans.

It has begun to be known that the Commissioners are not likely to get many bids. They must expect that there will be but few, and perhaps collusion between the competitors, and that, consequently, the evident enormous cost of the proposed scheme may be forced up to the point of exhausting the financial strength of the County, which, left weak and helpless, will sink down under the tremendous weight unloaded upon it under this cover of an alleged apparatus for heating and ventilating the new Court-house.

We have a parting word to add: We hope the many thousands of dollars (as much as $30,000?) spent in changing and adapting this building into a storehouse for this apparatus, and the space sacrificed, will not prove to have been wholly thrown away. We think that the Commissioners' expert house of contractors and engineers can afford to give up the $1,000 they are to receive for services in specifying their own materials, and pay $10,000 for the monopoly and privilege thus accorded them. We think that they ought to do it. Suffolk County, in Massachusetts, will then have reason to be doubly grateful to them, and be better able, with this legacy in reserve, to keep in repair the monument with which, at her expense, they propose to perpetuate their memory.

Engineer.

M. DIEULAFOY'S DISCOVERIES AT SUSA.

The new attraction at the Musée du Louvre in Paris is the Susa Gallery. Directly above the Salle Assyrienne a handsome and spacious apartment has been fitted up for the purpose of holding the marvellous specimens of Achæmenidian architecture and Achæmenidan art which M. Marcel Dieulafoy has dug up out of the mounds that cover the site of the ancient capital of the Persian Empire. After two years spent in arranging the collection — a task that, for reasons which will become apparent in the course of this article, involved unusual difficulties — the gallery is now thrown open to the public.

It was in December, 1884, that M. Dieulafoy, accompanied by his talented wife, Mme. Jeanne Dieulafoy, and two assistants, Messrs. Babin and Houssay, left Paris, intrusted by the French Government with an archæological mission. The extensive mounds which were the immediate goal of the expedition had attracted the attention of travellers for many years. As early as 1851 Sir William Loftus visited the village, which still retains the ancient name of Shus, or Susa, to the north of Dizfoul, in the south-western corner of modern Persia, and made a careful examination of the mounds at that place. He found unmistakable proofs of the existence of ruins beneath these vast accumulations of dust and rubbish, and hoped to induce the authorities of the British Museum to undertake excavations on a proper scale. But the archæological interest was at that moment centred upon the mounds, similar in character and formation, on the banks of the Tigris and in the valley of the Euphrates. A few years before, the Frenchman, P. E. Botta, had astonished the world by unearthing the palace of King Sargon at Khorsabad, and Sir Austen H. Layard, following close upon the heels of Botta, created a veritable sensation by the discovery of old Nineveh, with the palaces of several Assyrian kings. A second French expedition was about to be sent into the field, and Sir Henry Rawlinson was busily engaged hunting for the "foundation" records of Nebuchadnezzar at Birs Nimroud. Thus the glory of resuscitated Nineveh and of reawakening Babylon threw everything else into the shade for the time being, and Susa was destined to be neglected until the worthy compatriot of Botta took up the spade. M. Dieulafoy was particularly well fitted for his task. Extensive travels in Persia made some years before had made him thoroughly familiar with land and people; prolonged studies in Persian art, of which his five volumes on "*L'Art Antique de la Perse*" are the fruit, had secured for him a high rank among archæologists, while his practical profession as an architect and his long experience as "Ingenieur en chef des Ponts et Chaussées" in Paris gave him additional advantages, which were no small factors in his success.

Arrived on the spot, M. Dieulafoy encountered the same opposition from the natives which all explorers in the Orient have had to face, and this despite the firman with which he was provided. The fanaticism of a Mussulman populace, fanned by the agitation of a still more fanatical clergy, form a combination which it is exceedingly difficult to master, and when to this front be added the intrigues of officials greedy for bribes, one is surprised to find that Dieulafoy should have succeeded at all in carrying out the object for which he came. In reading his narrative, one is struck more particularly by the close analogy existing between the vexations which he had to endure and those which rendered Sir Austen Layard's life miserable during his sojourn in Mesopotamia some forty years ago — another instance, and a very unsavory one, of the well-known Oriental conservatism. Mohammedans are taught to look upon every scientific effort not bearing directly upon their religion with a contempt not unmingled with dread. To resuscitate, accordingly, the "buildings of the infidels" is both impious and dangerous. Hence every attempt at any kind of excavations in the East is frowned upon, and it is only in the face of the indomitable spirit of a Layard or a Dieulafoy — aided by a sufficient quantity of baksheesh — opposition in the end is forced to give way.

The half of February had gone by ere Dieulafoy sighted the mounds of Susa. Every day was of the utmost value to him, for in a few weeks the approach of the hot and rainy season would compel him to interrupt his labors. Fancy, then, his exasperation when, in response to an appeal for workmen, despite the prospect of good pay, three men and a child presented themselves. To add to his impatience, the Governor of the province, with a coolness that challenges admiration, wrote to Dieulafoy, in reply to his demand for assistance, that it would be better for him to desist from stirring up the prejudices of the population, and, assuming a tone of concern for Dieulafoy's safety, he suggested that Dieulafoy leave his baggage at Dizfoul and pay the Governor a visit at Schuster, when they might at their leisure talk over matters. Dieulafoy was not long in suspecting the Governor to be in league with the opposition. The existence of graves in the mound was a further weapon in the hands of his opponents, and the clergy were particularly loud in their denunciation of this profanation of the soil. The same cry was raised when Layard started to dig at Nimroud, and it was afterward ascertained that the Governor of Mosul had given secret instructions to remove tombstones from an existing cemetery and plant them in various parts of the mound at Nimroud. The graves at Susa seemed to be of a more genuine character, but Dieulafoy showed that they were the graves of the "infidel" Parthians not of believers. The appeal to consistency was probably not of much avail. What enabled him to conquer in the end was his dogged obstinacy. He simply would not "go." He remained on the spot, despite the alluring invitation of the Governor, and devoted himself to quieting the fears of the populace, who were told, among other things, that the Frenchman had come "to spy out the nakedness of the land." By degrees workmen came, and the work of digging could be begun, Mme. Dieulafoy herself setting the example by striking the first blow with the pick. It was not long before Dieulafoy was able to determine with tolerable certainty the nature and extent of the remains which the mounds contained. Trenches were opened at various points, a wall encircling a building of vast proportions was traced, and it was ascertained that the edifice in question must have consisted of several and sharply-marked divisions. Bricks bearing cuneiform characters were found, which made it clear that the edifice was none other than the palace of Artaxerxes Mnemon, or Artaxerxes II, the seventh monarch in the Achæmenidan dynasty, who ruled over the Persian Empire from 406 to 359 B. C. Short inscriptions found by Loftus in the course of his examination of the mounds had also borne witness to the fact of a palace having been constructed at Susa by this same Artaxerxes. Dieulafoy's thorough knowledge of Persian architecture, as exhibited by the ruins at Persepolis and elsewhere, aided him in fixing upon the general distribution of the

apartments of which such a palace was composed, and he now devoted himself more especially to that portion of it where he conjectured the grand reception or "throne" room to have been situated, and which promised a particularly rich return. His expectations were not disappointed. The trenches being widened, they came into the "throne" room itself, where hundreds of glazed tiles in various states of preservation still bore witness to its former glory. Each tile, as it was taken out, was carefully numbered, and upon piecing them together it was found that they formed part of a large frieze representing a series of lions, whose fierce look, as they stand to-day in the Louvre, still is well calculated to inspire terror. These glazed tiles constituted the decoration of the palace walls, corresponding to the alabaster slabs, which was the ordinary material employed by the Assyrian kings in their palaces.

It may be imagined into what ecstasies of joy this discovery threw the Dieulafoy party. But still greater surprises were in store for them. From other sources, it was known that Artaxerxes had erected his dwelling on the ruins of an older building, which had been the work of his predecessor Xerxes, which had been destroyed by fire. Upon digging below the foundations of the "Apadana" of Artaxerxes, as this "throne-room" of the palace was called, M. Dieulafoy actually came upon abundant traces of this older building. Indeed, the glazed tiles found here form perhaps the most brilliant pieces in the "Susa" collection. Upon entering the gallery in the Louvre the first thing that will strike the eye of the visitor are the enormous friezes to the right and left of the entrance, showing a procession of archers. These friezes once graced the walls of Xerxes's palace, and what is most remarkable about them is that now, after a lapse of 2,000 years, they have been restored to view, the coloring on the tiles is almost as fresh and as gaudy as though the glazure had been put on within a few years. Specimens of glazed bricks have been found beneath the mounds both of Upper and Lower Mesopotamia which date probably from a period anterior to the conquest of the country by Persia, and there are reasons for believing from traces of coloring found on the slabs of the Assyrian palaces that the scenes sculptured on them were painted in many colors, but the art of glazing could never have been carried to that perfection in Babylonia and Assyria as was the case in Persia under the Achæmenidan dynasty. Here results were obtained which were simply marvellous, and which have never been surpassed since. Dieulafoy began his archæological studies with the avowed purpose of finding the source for the brilliant decoration which plays so prominent a rôle in Arabian architecture, and here in the palaces of Artaxerxes and Darius he found not only this but also the prototype for much of the art that through the Arabs has come down to us. Herodotus speaks in his history of the guards of archers known as "the immortals," who were in constant attendance upon the Persian king, and Dieulafoy is of the opinion that the men on the friezes are intended as a representation of this body-guard. Another interesting question raised by the discovery is an anthropological one. Upon placing the scattered tiles in position it was noticed that there was a difference in the coloring of the hands and faces. While some presented the complexion common in the Orient, others were of a decidedly black hue, pointing apparently to an African origin. Have we here traces of a black race that once flourished in this region, and to the existence of which a number of other circumstances would seem to point, or did the Persian kings import these men from the other side of the Red Sea? Professor Houssay, one of the members of the Dieulafoy expedition, is at present engaged in studying this important problem.

It will now be clear why the work of arranging the collection which Dieulafoy brought along involved such an expense of time and labor. The thousands of tiles had each to be carefully examined and the position of each to be accurately determined. Naturally, upon placing them together, both in the cases of the archers of Darius and of the lions from the apadana of Artaxerxes, there were gaps everywhere. In order to furnish the visitor with a vivid picture of the actual appearance of the friezes in the palaces of the Achæmenidans, M. Dieulafoy went to the great trouble of restoring the missing portions in following most faithfully, as a matter of course, the original designs. He has been severely criticised in some quarters for this attempt, but, as I believe, unjustly. The student of art will not be led astray by these restorations, which, moreover, are conscientiously indicated on a drawing placed at the side of the friezes, and the layman will certainly carry with him a far clearer and withal faithful impression of old Persian art than could possibly have been the case with merely a confused and imperfect lot of glazed tiles before him. What deserves more justly to be criticised is the arrangement of the tiles in the friezes of the archers on which cuneiform characters are inscribed — in the same brilliant colors — and which are evidently misplaced. As they now stand they give no sense whatever, and all that can be recognized is the name of Darius. Besides, it is more than likely that the inscription was beneath the pictures of the archers, as is generally the case on Assyrian slabs, and not between the pictures, as Dieulafoy seems to believe. The vestments of the archers call for special notice. The short tunics fall in graceful folds over the shoulders, and the variation in the patterns of the garments adds materially to the effect produced.

Let us return to the field of excavations for a moment. With the approach of the hot season the Dieulafoy party deserted their camp, but early the following winter they were on the ground again. Things went more smoothly now, though there was still an opposition to contend with, and already in December work was recommenced at the mounds. By the end of the season the funds at the disposal of Dieulafoy were exhausted, and he was obliged to close his labors. His success during the second season was not less significant than during the first. Among the discoveries made there is only room here to mention the wall supporting an enamelled brick staircase. Mme. Dieulafoy claims this piece as her particular share of the discoveries, for she was the first to literally stumble over it, while engaged in digging a large piece of the wall that now occupies a post of honor in the Susa Gallery, and a most gorgeous piece of workmanship it is. The design, consisting of a series of rosettes, is delicately executed, and, as in the case of the friezes, blue, green and yellow are the predominating colors. With the whole palace fitted up in the fashion of which the friezes and the staircase may be taken as samples, the effect must indeed have been startling in its grandeur. Dieulafoy also brought along portions of those enormous columns of solid stone which run in the form of a colonnade around a wing of Artaxerxes's palace. The longest of these is over 17 feet high, but the calculation is that in their perfect state they measured over 80 feet with a circumference of about three feet. The style of the column is distinctly Ionic, but it is spoiled by a grotesque figure of a double bull worked in bronze which surmounts it. The combination, inartistic though it be, is exceedingly instructive as illustrating the attempt made by the Achæmenidans to combine two wholly different species of art and architecture. The idea of the columns is a direct importation from Greece, if they are not indeed the work of Greek workmen brought over into Persia for the purpose, a supposition which appears to be borne out by passages in the works of some ancient authors, while the bulls are borrowed from the Babylonians and Assyrians, in whose architecture they occupy, as is well known, so essential a place. It is quite impossible to conceive an Assyrian palace without the bulls in various shapes and forms guarding the approaches to the palace chambers. The combination of Greek with Babylo-Assyrian art has produced the monstrous creation above referred to. It would appear from this that the originality of the Persians in their art was confined to their methods of glazing and enamelling, and it is probable also that not only in the construction of their edifices but also in their inner disposition of the various quarters they followed foreign models, in the first instance Assyrian models.

Thanks to the attainments of M. Dieulafoy as architect and civil engineer, he has been able to ascertain the relative position of the various quarters of which the palace of Artaxerxes was composed, with tolerable accuracy, despite the fact that he has only excavated what is in reality a small portion of the edifice. From the plan which he has drawn up it appears that the palace consisted of three distinct wings, the "apadana," or public reception-rooms, the harem and the apartments of the King. Included under the latter were the rooms set aside for the royal attendants as well as for the immediate family of the King. A wall ran around the whole edifice, and as an additional protection for the sacred person of his Majesty, the two entrances leading to his apartments, the position of which was admirably chosen with a view of securing exclusion combined with safety, were guarded by sentinels kept posted there. What adds to the interest of M. Dieulafoy's discovery is the remarkable agreement to which he himself has called attention between the references to the palace of Ahasuerus in the Book of Esther and the very building which he has unearthed. The three wings just referred to are distinctly mentioned by the biblical author under their proper designations as "Bithan," which corresponds to the Persian apadana, the "house for the women," which is the harem, and "the house of the King," which represents the third quarter. Moreover, the position of these three quarters tallies with the picture of the palace which we would necessarily form had we the Book of Esther alone to guide us. Adjoining the bithan or apadana was the harem, and immediately to the south of the latter were the royal apartments, the three forming together an inverted letter L. The Book of Esther, it will be remembered, opens with a magnificent description of the festival which King Ahasuerus gave in the bithan, and is worthy of note that in the delineation of the splendors of the palace the colors of the draperies singled out for special mention are the very ones which appear most prominently in the decoration of the friezes and the staircase. Again the scene where Queen Esther approaches his Majesty becomes all the more vivid now that we know that the King's throne was stationed at the back of a hall in the centre of his apartments facing a corridor which led into the harem. He was so placed, accordingly, that he could see any one approaching from quite a distance, and could, by raising his sceptre, indicate that he granted the visitor permission to step before him. There was a second entrance to the King's rooms by a fortified gate to the left, and it is by this gate that the King's minister, Haman, is represented in the book as coming to the King. The terms used to denote these small details are all so exact that the conclusion is well-nigh forced upon us that the biblical writer who, it will be recalled, places his narrative in the city of Susa, must have had before him the very building which Dieulafoy has found, and it is in accord with the general conditions reflected in the book to suppose that it was written at Susa during the reign of Artaxerxes.

I have only spoken above of the large objects in the collection, but there are hundreds of smaller articles that might be mentioned. M. Dieulafoy shipped in all 70 boxes from the scene of his labors to

Paris; among these many handsome jars and vases, several hundreds of seals and cylinders, numerous ornaments of a miscellaneous character, and — what is particularly valuable — about 20 large unglazed terra-cotta tiles in a good state of preservation. These tiles are covered with inscriptions in the cuneiform character, and when they come to be deciphered, as no doubt they soon will be, our knowledge of the occurrences in the reign of Artaxerxes will be still further increased. There are good grounds, too, for believing that with the continuation of the excavation still further inscriptions will be brought to light. Indeed, it must be borne in mind that Dieulafoy has, after all, only made a beginning with the great mound at Susa. The results obtained are the more marvellous because of this fact, but the hope is expressed on all sides that the French Government will enable its distinguished citizen to continue the important mission which he has so successfully begun, and for which he has shown himself to be so eminently fitted. A countryman of Dieulafoy, Ernest de Sarzec, who spent several years digging at Telloh, in Southern Mesopotamia, has shown that it is far more advisable to confine one's efforts to exhausting, so far as possible, one mound, rather than what so many of the predecessors of De Sarzec have done, and superficially work over a large territory. — *Morris Jastrow, Jr., in the New York Times.*

COMMUNICATIONS

THE AMERICAN ARCHITECT SCHOLARSHIP.

Boston, Mass., January 7, 1888.

To the Editors of the American Architect: —

Dear Sirs, — The architect in whose office I worked for three years, was a member of the American Institute from 1858 to about 1867. Would the fact that he resigned in the latter year prevent my competing for the Travelling-scholarship next June?

Yours, Draughtsman.

[No. The reason for formulating the condition which has given rise to this question was merely to make sure that applicants had received a certain minimum amount of good training and so to lighten the labor of the examiners by ruling out those who probably had had less. — Ed. American Architect.]

NOTES AND CLIPPINGS

The Duchesse de Galliera. — As the late Duchesse de Galliera expended more money than any lady of our time upon building and conservation, her death should not be allowed to pass unnoticed in this journal. The name of the Duchesse does not, moreover, appear for the first time in *The Architect*, as the fine series of illustrations of the "Cities of Italy" which we published in 1873 were from paintings by Paul Baudry in the mansion of the Duchesse in the Rue de Varennes. The Duchesse was born in Genoa, and that city owes much to her liberality. A sum of 25,000,000 francs was expended on the harbor, the mansion belonging to the Duc, with its contents, a gift valued at 7,000,000 francs, was made over to Genoa, and in addition two hospitals were constructed at a cost of 7,000,000 francs. In Paris the erection of the Musée Galliera cost 5,000,000 francs, and a still larger sum would have been expended but for an error in drafting a deed by which the Musée became the property of the city, when the donor's intention was to enrich the State. Two blocks of workmen's houses cost 2,000,000 francs; 11,000,000 francs were spent on the erection and endowment of the Hospital de Clamart, and no less than 24,000,000 francs upon the erection and endowment of an orphanage at Fleury, and an asylum at Meudon. The Duc was known as a great railway contractor and speculator, and is said to have left a fortune to his widow that was valued at nine millions sterling. The greater part of that vast sum has been expended for benevolent purposes, and builders have reason to regret the loss of so munificent an enthusiast. — *The Architect.*

Heating Buildings by Exhaust Steam. — At a recent meeting of the New England Railway Club, John A. Coleman said: I have had a long experience in heating buildings by steam. When the matter of using exhaust steam was agitated, and most people were opposed to it, we took a number of mills, using then a sixteen-foot tubular boiler, and averaged a ton of coal a day. We heated the mill by using large pipes, having the circulation as straight as possible, open and free, with about two pounds back pressure on the engine, using no direct steam except in the morning in starting up and on Sundays. I had similar experience in heating the building of the Providence Tool Company during the war. The building was seventy feet wide by more than two hundred long, the rooms with fifteen-foot studs, and large windows in an exposed situation, then heated by small pipes all around the walls, and using about a ton of coal a day for the boiler. In reconstructing we took out the small pipe, cut it up into coils, which we placed in the centre of the building, using a six-inch pipe as the main artery through the building, and a two-inch socket-pipe for the condensed water, avoiding bends everywhere as much as possible. Result was that the building was overheated by using only exhaust steam, and about two pounds back pressure and no extra coal was used for the fires. My idea in heating is to use large pipes and carry a large body of steam to the point where you want to use it, and not strangle it on the way. — *Iron Age.*

Another Big Well in Iowa. — A Waterloo (Ia.) despatch to the Chicago *Tribune* says: "The flowing well near Tripoli, Bremer County, is attracting considerable attention, as it appears to be another Belle Plaine gusher on a slightly smaller scale. It is located on the farm of J. J. Cooke, about three miles east of Tripoli, and only a short distance from the Wapsie River. The well was drilled down through the rock and sand about 135 feet. Water was struck several times, and when a depth of 129 feet was reached the water filled the well to within eight feet of the surface. After drilling two hours longer the water began to overflow. Work was stopped and a six-inch casing put in. At three o'clock the next morning, December 30, Mr. Cooke was awakened by a roaring noise, and, on going to the well, he found the water spouting about three feet above the top of the tubing and throwing out blue sand and clay. After throwing out about three wagon-loads of this débris the water became clearer, but its force increased until it rose fully six feet above the top of the casing, besides opening the seams in the casing at several places. Four joints of stovepipe were then put on the casing, and the water flowed in a torrent from the top of this improvised tube fully twelve feet from the ground. "Since then the well seems to have lost some of its force, but it still sends out a stream, which, if confined, would, it is estimated, throw a three-inch stream fifty feet high. It is the intention to replace the casing in the well with a six-inch gas-pipe, and in that way it is expected that the flow of water can be controlled.

TRADE SURVEYS

Business authorities in six or eight of the larger cities of the country who have gone to the trouble of examining into building probabilities for the ensuing year, are strongly inclined to believe that, taking the country all through, there will be an increase this year of five to ten per cent at least in building operations which will be mainly of small houses in the smaller cities and towns. This statement is based upon the opinion or belief that most of the manufacturing expansion will be made in these cities where advantages are very inviting, more so than in larger cities where real estate is high and taxes oppressive. Besides, circumstances and factors are still at work and more strongly now than at any time point to a multitude of smaller industries through localities now barren. This tendency is apparent in any direction that observation is made. The advantages of location in the larger Eastern cities are not as great as they were a few years ago when special rates gave shippers there advantages over other nearer consumers. A second fact is that fuel is being supplied in a large section of country at a low price where heretofore it was not to be had at any excepting extremely high prices, and third, artificial fuel is now being made at very low prices. Manufacturers recognize that this fuel is now being made and utilized very generally in localities which heretofore have been almost without manufacturing facilities. Another factor which is worth noting as contributing to this scattering tendency among our industries is the willingness of capital to benefit itself with bringing industries almost anywhere. The fact has been mentioned heretofore that there is less opportunity and inducement for capital to go into railroad enterprises and it must therefore seek industrial channels. This tendency is a very marked one. The huge volume of capital that has found its way into the Southern States during the past year shows the strength of the movement. On account of the lack of facilities for obtaining reliable statistical information concerning new industries, only guesses can be made or statements relied upon by the leaders in these new industrial enterprises in these new sections from reliable authorities in Ine off cities such as Nashville, New Orleans, Kansas City, Fort Worth and smaller towns attesting a much more general movement of capital into the country of which these cities are at present the business centres. All of this activity means that house-building will be prosecuted more vigorously. There has been a scarcity of houses all over the new West and the new South and the necessity has of late induced a good many to undertake to supply it. Another influence deserving of study is the continued outflow of Eastern reserves to Western farmers. Some writers indulge in apprehensions over this tendency and regard it as dangerous. The West is very deeply indebted to the East but its productive capacity is being correspondingly increased and the borrowers at the end of the season have more wealth than they would have had had they not obtained the assistance of capital. The rates of interest are slowly moving downward and with this tendency the supplies of money seem to increase. Real estate in these new sections is rather declining excepting in the larger cities where business is more immense and elements of uncertainty have been more generally removed. Putting all these things together and a good many more, building authorities have expressed opinions thus early in the season and are quite certain that work will be abundant and that building material of all kinds will be in active demand. The brick-makers seem to be acting in view of this probability. The lumber manufacturers are doing the same. White and yellow pine will come into very sharp competition throughout the West. The Arkansas supply will be thrown into the market and will probably help to depress the Michigan and Wisconsin products. Southern railroad managers are giving attention to the lumber traffic as well as to the iron traffic with a view to increasing their receipts from these sources. On iron, freight rates were advanced last week very high, to fifty cents to Western points and to Southern points twenty cents per ton. These conflicting rates show what railroaders propose to do. On the old lines they propose to charge all the traffic will bear and on the new roads they propose to increase the volume of business as much as possible. Late advices from the cotton-fields in the South show that the increase of capacity will not be so great this year, not that there are any actual disagreements. The lumber concerns are securing a greater control over production and increase their capacity at smaller cost than new mills starting up. The iron-makers throughout the country report a backward demand just at present. The steel-rail makers have nothing whatever to say. The amounts of railroad building is uncertain. Regarding the probability of a combination among all of the big roads of the country it can be stated that it is almost chimerical. The leaders of the great system will want to retain their independence and control over their respective systems. They recognize that there are a great many dangers to be encountered in the development of the railway systems of the country, that a great many risks are to be run and that some of the roads may go down under the contest. Besides, they are sure that the Government and the railway commission will deal more leniently with them although holding them to the law as it is, with perhaps a few unimportant modifications effected for the lubricating of rough places.

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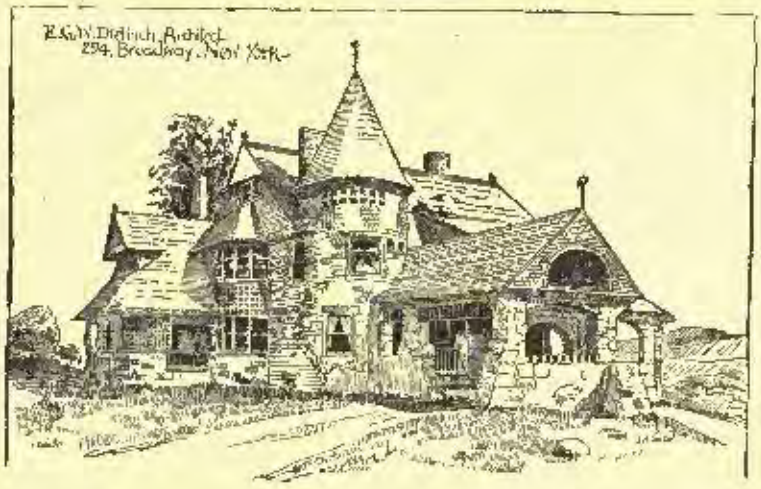

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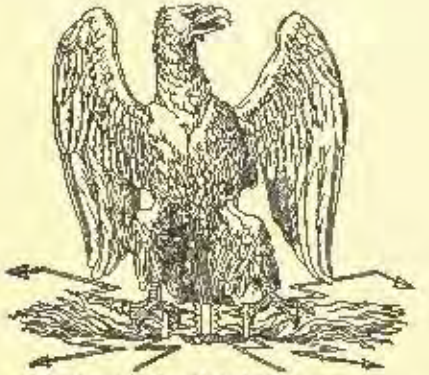

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After Raguenet.

EAGLES AND LIONS.

The American Architect and Building News.

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JANUARY 19, 1889.

Entered at the Post-Office at Boston as second-class matter.

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WHATEVER may be the result in the matter of the Massachusetts State-House competition, two things of service to the profession have been accomplished, one which concerns public ethics, and the other which will have a certain weight as a semi-legal precedent. To be sure, both the utterances to which we refer are merely legislative and not judicial, and so fall short of what is desirable. Still, it is no small matter for so important a body as the Massachusetts Senate Committee on Finance to report that a resolution looking to the remodelling of the terms of competition for the State-House alteration "ought to pass." Nor is it without its value that Mr. McDonough, of Boston, should declare, without exciting contradiction, that any architect laying his plans before the Governor on January 20, in accordance with the terms of the original advertisement of competition, would "have legal claim against the State." We hope, if any designs are submitted and the authorities find themselves disposed to withhold the promised awards, that the architects who may have furnished designs in strict compliance with the terms of competition will carry their case at once before the courts. The entire profession could afford to contribute funds for prosecuting such a cause and Massachusetts, if the case went against her, would willingly sacrifice the money for the sake of aiding to establish so desirable a precedent. We trust the action of the House in recommitting the resolution for further consideration will not prevent its being finally enacted.

THE manly protest of the Massachusetts architects against the unsatisfactory terms of competition offered by the committee of the Legislature for designs for the State-House enlargement, and still more, perhaps, the cordial support which, as our columns show, has been accorded to their position by the best architects in all parts of this country and Canada, has had the effect of causing the unanimous adoption in committee of a resolution, given in full in another column, which increases the appropriation for premiums from thirty-seven hundred dollars to eight thousand, extends the time for submitting designs to the end of March, appropriates five hundred dollars for expert advice in making the decision, and directs that the architect whose plan is adopted shall be employed to superintend its execution. So easily has been won the first encounter in what many thought would be a desperate and almost hopeless battle, and so easily will those persons generally win who have courage and self-respect enough to stand out for what they know to be fair treatment. As we have often said, the public bears no malice toward architects. It wants their services, and is willing to pay a reasonable price for them, and to treat those who can furnish them with all due consideration, but of what architects would call proper consideration it has not the smallest idea. Hitherto, the decent architects have been generally too modest or too proud to say what sort of treatment they wanted, and have left the field of official competitions to the sort of persons who consider it a favor to be kicked, and the public has supposed that all architects were of the same humble disposition with those who ran after its state-house and school-house "jobs." Now that this illusion has been dispelled, and the architects of reputation have declared their position in regard to open competitions, the public, far from resenting the movement, will, we venture to say, be pleased at having found out what architects really want, and at being enabled at last to frame invitations which will be acceptable to them. Of course it will, as it always does in matters outside of its every-day experience, only emerge from one blunder to plunge into another, and the axioms of fair competition are still nearly as far as ever from being really understood by anybody but architects; but the latter will, at least in Massachusetts, have learned the lesson that they can generally get decent treatment by asking for it, and that, if they do not claim it for themselves, nobody else is likely to volunteer to be their champion.

WE doubt if many of our readers have taken any part in the Grant Monument competition, the terms of which were very poorly calculated to attract architects and designers of the better class; but it is of some interest to know that about a hundred drawings and models have been sent in, and that the Executive Committee of the Monument Association has appointed as its jury of experts to look over the designs, and report on their merits to the Committee, Messrs. Post, Ware (W. R.), Le Brun, Ware (J. E.), Renwick, architects and Professor Wolf. After that is done, it is possible that all the designs may be exhibited to the public, for an admission-fee, the proceeds to be added to the monument fund. Whether such an exhibition would do much to increase the fund may be doubted, the public in general taking about as much interest in architectural drawings and designs as in Egyptian hieroglyphics, but it would have a certain attraction for the profession, and we hope the idea may be carried out.

BELGIUM is a place where architectural competitions are very much in vogue, being favored by the profession, as well as the public, and the secret of the mutual satisfaction of both parties to these may perhaps be inferred by comparing the following programme, abridged from the notice published in *L'Emulation*, with the terms usually proposed to architects in this country. The invitation is issued by the city of Verviers, which proposes to build a small theatre this summer, to cost about ninety thousand dollars, and calls architects to a two-fold competition. For the first competition, each participant is to furnish sketch plans and sections at one-two-hundredth the full size, or very nearly one-sixteenth of an inch to the foot, and elevations at double this scale, all rendered in tint, together with a memorandum of materials to be used. Each set of sketches is to be signed with a cipher, and must contain two envelopes, both endorsed with the cipher, one containing the real name of the author, and the other, marked "Vote," the name of the architect whom he wishes to have on the jury. These plans are to be handed in by March 1, and will then be judged, the decision being promised before March 15. The number of competitors to be admitted to the second trial is not given, but six hundred dollars will be equally divided among those chosen by the jury, whatever the number may be. The date for closing the second competition is to be fixed hereafter. Each competitor is to send plans, sections, and elevations at a scale of one to one hundred, or about one-eighth of an inch to the foot, rendered in tint, together with an estimate of cost of the rough work, and estimates, prepared by specialists, of the cost of heating, electric-lighting, and stage-fittings. The jury will be the same as in the preliminary competition, and the author of the design placed first, if it is found that his design can be executed for the specified sum, is to be appointed architect of the building, and is to be paid five per cent on the total cost, in return for which he is to furnish all the drawings and details required, the city providing the necessary superintendence, through its Department of Public Works, at its own

expense. The architect is to be paid one per cent on the proposed cost when the principal contracts are signed, and four per cent on each payment made to the contractors afterward. The authors of the plans placed second and third in the second competition are to receive three hundred dollars each, in addition to their share of the six hundred dollars awarded in the preliminary competition. In case the design placed first cannot be contracted for within the specified sum, the municipality is to have the option of having it remodelled by the author, or of taking possession of it and employing some other architect to remodel it. The jury is to consist of seven members, one of whom is to be the City Commissioner of Public Works; the second another specified municipal official; the third a manufacturer of the city; the fourth an architect nominated by the city; the fifth the city-engineer; the sixth an architect designated by the Société Centrale des Architectes; and the seventh the architect receiving the greatest number of ballots from the competitors.

MR. FRANCIS HOOPER recently read before the Royal Institute of British Architects an excellent paper on French building laws, the provisions of which become every day of more interest to the inhabitants of our growing cities. The general municipal-regulations in regard to building in Paris are known to most of our readers, but a good deal is to be learned from the different customs prevailing in the provincial towns. Outside of Paris, for example, when it appears that the widening of a street or the removal of an obstruction will soon become desirable, a survey is made, the value of the land to be taken is appraised as if it were vacant, without regard to the buildings that may be standing upon it, and the town or city buys it at this valuation, stipulating with each owner that so long as the building upon his part of the land remains fit for occupancy he shall not be disturbed in the possession of it, but that no structural repairs shall be made to the walls or foundations of the portion standing on the land acquired by the public authority, which would tend to prolong their existence. By this sensible arrangement the town or city acquires the land necessary for its future improvements without having to pay for any buildings on it, loss of rent, damage to tenants, or other expenses, and at a time when the cost of the land itself is probably much less than it would be later, when the improvements are actually in progress, while the expropriated owner is comforted by enjoying for some years not only the undisturbed possession of his house, but compound interest on the value of his land, and the changes desired are effected as surely as by the methods in use here, and at a fraction of the cost, although the process is a slower one.

A NEW device for reproducing drawings is described in the *British Architect*, which seems likely to find extensive application in architects' offices. In principle it appears to partake both of the autotype and the heliotograph, with more advantages, and fewer disadvantages, than either. The drawing is made with lithographic ink or crayon, as in the autotype process, but instead of transferring it to stone, it is executed directly upon a prepared plate of zinc, which may be had of suitable texture for either pen or crayon, and is said to be very pleasant to work upon. The plate is next covered with a fixing solution, which is allowed to dry, and is then washed off with water. The third step is to transfer the drawing to the printing pad, which is done by applying ink with a roller, and placing the plate and the pad in contact under pressure. The paper for printing is next pressed on the pad, and receives an impression exactly like the original drawing. If several copies are desired, a corresponding number of pads may be treated, or successive transfers may be made on a single pad, either washing it with cold water after each application, or trusting to the accuracy of the register formed by bars provided for the purpose. The original plate is cleaned with a special solution, and used for other drawings for an indefinite period.

A NEW device for blue-printing large drawings has been lately used, which many architects who have only small frames may find useful. A cylinder, of any material, covered with felt, is used instead of a frame. The cylinder should be long enough and of sufficiently great diameter to allow the drawing to be wrapped around it without overlapping. The sensitive paper is first drawn around the cylinder, and the tracing placed over it and smoothly stretched by means of clamps, or double hooks with springs. The cylinder is then placed in some sort of framework which will allow it to be revolved, either by hand or by a weight. The printing is done quite as rapidly as under glass, and the impressions are sharper, as the tracing-cloth can be drawn around the cylinder so tightly as to remove the wrinkles which always appear under the glass in the ordinary frame. We should think that the paper-barrel manufacturers might furnish cylinders three or four feet long, and sixteen inches or more in diameter, which would serve an excellent purpose, and might be mounted, for printing, in brackets outside the office-window, with an endless cord and two pulleys for securing rotation, and the office-boy for a motor. By using rubber bands, a large number of negatives could be placed on the cylinder at once, over a sheet of sensitive paper of suitable size, and printed together.

THE *Builder* describes a new bath-house just built in Frankfort-on-the-Main, which seems to solve the problem of cheap public bathing more successfully than anything of the kind yet attempted. The building, which is placed in the centre of a small square in the workingmen's quarter of the town, is octagonal in plan. Each side of the octagon measures fourteen feet, which would give a diameter of about thirty-four feet. The walls are twelve feet high at the eaves, and rise, with a pitch sufficient to carry off water, to a central portion, also octagonal, which rises to a height of twenty feet. The central octagon, which is about twelve feet in diameter, contains the furnace in the basement, the drying-room for linen in the first story, and a hot-water tank above, the chimney being in the centre of all. Around the middle octagon are ranged fourteen trapezoidal cells, and outside of these is a passageway. The segment nearest the entrances is reserved for a towel store-room and administration. There are two entrances, one for men and the other for women, and between them is the ticket-office, which communicates with the store-room behind it. Four of the cells are allotted to women, and ten to men, by intercepting at the corresponding point the exterior passageway, but the proportion can be varied as required. A water-closet is provided in each division. Each cell is entered from the passageway, and is divided by a waterproof curtain into two parts. The outer part, next the passageway, forms a dressing-room, with chair, mirror, hooks, and linoleum carpet. The inner portion contains a basin, with hot and cold water and a douche, the temperature of which can be regulated at pleasure, the waste-water passing off under the wooden grating on which the bather stands. The charge for a bath, including a clean towel and soap, is two cents, and the place is already visited by two or three hundred bathers a day. The building cost less than five thousand dollars, and stands on public ground. Supposing the number of bathers to average only two hundred per day, the gross income, at two cents each, will be twelve hundred and fifty dollars a year. The *Builder* thinks that fuel, water, light, washing, attendance, and wear and tear would not be more than seven hundred and fifty dollars a year, which leaves a net profit of ten per cent on the capital invested. With us the expenses would be greater, but at three or four, or perhaps five cents for a bath, the profit of such an undertaking ought to be considerable, and the benefit to the public health would be incalculable.

A NEW appliance for increasing the speed of steamships was recently described by M. Gouilly to the Société des Ingenieurs Civils, which promises to be of use. Every one who has watched the operation of the propeller in a screw-steamer must have regretted the waste of energy involved in the splashing and churning of the water about the screw by its revolutions, and the displacements which can be seen to extend to a considerable distance laterally. M. Gouilly's plan for preventing a large part of this waste of power is to have the propeller work in a hollow, truncated cone attached to the stern of the ship, having its larger end open and directed toward the bows, and its smaller end continued for a short distance by an open cylinder. One would think that such an apparatus would be a terrible drag upon the motion of the vessel, but its effect in concentrating the energy of the screw is so great that more than a thousand trials, made with thirty different screws, have demonstrated that the force of propulsion is, on an average, doubled, and in many cases is increased in a far greater proportion.

AUGUSTE RODIN, SCULPTOR.[1]—I.

IT has been well said that the Paris *Salon* is an epitome of human life. To its welcoming doors come each year the sufferings, the struggles, the self-sacrifices and the labors of the artists of all nations. In it, centre their hopes, their fears, their joy and their desperation. It is the competing ground of all the world of art; a living panorama, a Mecca, a confession and a judgment. Human above all, time alone confirms or reverses its dictum.

Among the many hundreds of works of sculpture of every conceivable description that sought admission to the *Salon* of 1877, was an unobtrusive nude figure, in plaster, accompanied with the usual paper upon which were written, in a strange hand, these explanatory words: "Auguste Rodin, born in Paris, pupil of Messrs. Barye and Carrier-Belleuse, Rue Bretonvilliers, number 3—'L'Age d'Airain'; statue, plaster."

The character of the modelling of this statue was so unusual, and its general effect so life-like, that some members of the jury of admission suspected that it was not a veritable piece of modelling, but a "*moulage sur nature*"—a reproduction, by pressing, from a mould on the living model—and, therefore, not entitled to admission. This suspicion meant that the figure was a fraud and its author an imposter. The statue caused considerable and varied comment among the jury, one of them remarking: "If it is not a cast from Nature, he who made it is stronger than we are." It was finally accepted, under protest, and put in a side space near the entrance reserved for objects of questionable origin and merit.

To the author of "The Age of Brass," who is one of the most sensitive of men, and loyal to the most exacting requirements of his art to a degree as rare as it is high; who had studied and labored like a slave in the most complete obscurity, and suffered the acutest privations for more than twenty years, the suspicion that he was a dishonest man and his work a counterfeit was humiliating to the last degree. Nor was this all, he had been an obligatory server of others all his life, and he had drank to the depths the bitter and despicable experiences that fine souls endure in their struggle against poverty outside the pale of human sympathy, and subject to the abuse of ignorant and brutal employers.

As the first complete result of all this, Rodin had, at the age of thirty-seven years, brought up to the *Salon* his simple work that he might see how it compared with that of good sculptors; and, more than all, to answer to himself as to whether fate had forever destined him to be a workman, or would now possibly reveal to him that he was an artist. But the inexplicable goddess who had thus far so persistently followed him in dark clouds, now appeared in a new and unexpected guise—she placed the mark of trickster upon himself and his work. He went to the *Salon* as one to be shunned. His statue was pointed at with scorn. What to do he did not know.

If there is one fact more than any other that makes Paris the heart of the art-world, it is that a real work of art or a real artist is never lost. Some one, sooner or later, finds them out and helps to put them into their deserved place. The living, radiating life of this fact is, that there are hundreds of artists, writers and men and women in private and public life, whose keen and receptive sensibilities are quick to discover and ready to welcome the appearance of everything that has in it the life, nerve and worship of art. They go to the *Salon*, not alone interested in the general average of the art of France, but to find out and acquaint themselves with the slightest and earliest indications of the coming of new men, and the appearance of advancing notes of progress. It was the good fortune of one of these devotees, Adrien Gandez, himself a sculptor of superior ability, to first see and fully appreciate the high qualities of the "The Age of Brass," after its arrival at the *Salon*. He immediately hastened to find some of his friends and lead them to the statue. They saw it with surprise, examined it with increasing interest and admiration, and left it fully convinced that it was one of the few master-pieces of French sculpture. Nor was this enough, they obtained a better place for it, where it could be seen by every one, and they talked about it and sung its praises as only enthusiastic French artists can.

At the same time M. Edmond Turquet, an ardent lover of art and of independent judgment, and who was also a member of the State Committee of Fine Arts and one of buying-committee of the *Salon*, in making his first visit to the section of sculpture, was strikingly impressed by the statue, of the author of which he had never heard. Soon after, when the buying-committee were making their first visit to the *Salon*, M. Turquet brought them before it, and invited their attention to its remarkable merits. To his astonishment they informed him that it was noised about that the figure was a reproduction from a mould, and not an honest piece of modelling. To which he observed, "If this report be true, the figure has no right to be here. If false, it ought to be bought by the State, as it possesses exceptional qualities." To this, reply was made that it was a very difficult matter to decide whether a statue was a veritable piece of modelling, or a cast from a mould. M. Turquet then said: "There is a chief-of-police in Paris whose duty it is to solve greater mysteries than this, call him and ask him to open an inquest. It must, certainly, be easier to find out the truth about this figure than to detect counterfeit money." Notwithstanding M. Turquet's urgent interest in the matter nothing was done, and the statue returned to the sculptor's studio, at the close of the exhibition, and so far as the authorities of the State were concerned, under the ban of counterfeit.

In the meantime admiration for the statue was daily extending, especially among the younger artists, and much curiosity was awakened in regard to the sculptor. No one knew him. To the inquiries, Who is Rodin? Where did he come from? The only answers were: He is a Belgian. A good-for-nothing, and will be soon disposed of.

The first inquiry has remained to this day unanswered, and the second inquiry and the first answer were explained in the catalogue of the *Salon*. He was a Parisian, though he had been in Belgium for some years previous to his appearance at the *Salon* with his "Age of Brass." The last answer and the prophesied result has long since been reversed into: "He is one of the greatest artists that France has ever produced, and has been so ranked by the best art-judges in the world."

Auguste Rodin was born in the Pantheon quarter of Paris, in the month of November, 1840, of parents in very humble circumstances. At an early age he was sent to a little boarding-school at Beauvais, of which his uncle was the principal, and where he pursued only the simplest studies. Neither the master, the school nor the lessons attracted him, and he spent the most of his time in drawing fanciful designs, telling stories and reciting imaginary descriptions to his comrades.

The only exercise of the school which gave him pleasure was writing descriptions of subjects, given out by the master and read aloud by him to the school. "The Miser" was, on one occasion, allotted to Auguste. It was an easy and timely one; a fruitful example was near at hand, and the sous-loving pedagogue was served up by his young relative with all the picturesqueness of which he was capable. The master read the dissertation without recognizing its identity, and complimented its author upon the excellent manner in which he had acquitted himself. But the scholars were more acute than their teacher, to them he was set forth in his true colors, and they warmly extolled the correctness of their fellow-pupil's description.

As the resources of the boy's parents were not sufficient to pay the expenses of his schooling any longer, he was obliged to come home when he was fourteen years of age. The tendency of his nature toward art had begun, many years before, to show itself in various ways more or less common to all children of artistic temperament. With Auguste, his first attempt at making anything was curiously characteristic of his maturer years. When he was five years of age, his mother was one day frying some cakes, the dough of which was first rolled thin, like pie-crust, and then cut up into various fantastic forms, before it was dropped into the boiling fat. These fanciful forms attracted the boy's attention, and he asked his mother to let him make some *men*, to fry. She assented, and he immediately made them so large that there was not dough enough to make many of them, or room enough in the kettle to fry them, and his mother hastened to cut short the ambitious career of the dough-sculptor. Strange as it may appear, the incident was not without its amusement and significance, for, when the men were fried, the dough had been tortured by the fat into such curious and striking positions that it made both the mother and child laugh heartily, besides indelibly impressing upon the latter's memory his first sight of the extraordinary movements that even a dough man could be made to go through. The reader will see, in the course of this narrative, that size and movement of figure are fundamental facts in Rodin's nature.

At fourteen, Auguste had no other thought except to study art, and his parents, though not particularly interested in it, or in his disposition towards it, sent him to what is now known the world over as La Petite Ecole, at No. 5 Rue de l'Ecole de Médecine, a school famous for its age, having been founded in 1766, and for its distinguished scholars, among whom are Guillaume, Fremiet, Carpeaux, Aubé, Dalou, and Le Gros. His teacher was Le Coq de Boisbaudran, of whom and the school Rodin now speaks in the highest terms. "They had preserved," he says, "a little of the eighteenth century in the school—good antique models and excellent teachers."

In beginning to draw from plaster-cast ornaments, the boy drew only the more prominent portions, and, thinking that there ought to be some details to fill up the spaces, thus giving completer interest to his work, he put in such additional forms as he thought best. The master, curious to know why the model was not more faithfully copied, discovered that his pupil was near-sighted, a fact which no one had previously found out, although Auguste had often wondered why he did not see things as other boys did. From this time on he was obliged to wear glasses. He remained in this school for three years, drawing and modelling in the morning and evening, and drawing at the Louvre in the afternoon. At fifteen-and-a-half years he gained his first recompense, a bronze medal, for drawing from

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the cast, and at seventeen a first bronze medal for modelling, and a second-class silver medal for drawing from the antique.

Though Auguste had no master at the Louvre, he soon found a permanent one in his love for and study of the antique, which soon became the only one he has ever acknowledged.

Before he had completed the three years at the school it became necessary for him to earn his own bread, as well as to decide in what way he was to do so. The force of his instinct for art had now become an authority, whose correctness he did not dream of questioning, and he determined to follow art. His mother, with true parental anxiety, and sharing the prevailing intelligence of the time, cautioned him against entering upon a career for which he had no solid preparation, and his family no means of providing. "If you wish to be an artist," said she, "you must have not only money to pay your teachers through a long course of study, but to help you along afterwards, for art, my son, rarely brings generous returns to its followers." To which the audacious youth answered: "I don't want any professors. I can work it through alone." Such an expression of independence and of apparently overwhelming conceit, coming from any one save such a character as Rodin has proved himself to be, would give anything but a favorable impression of the art-nature of him who uttered it, or of his probable future success. Nothing that he could have said would have been more opposed to what is universally accepted as the proper state of mind for an art-student to be in, as well in regard to himself as to the respect due to artists and art-teachers. It was an astounding and revolutionary position to take, but the true one for Rodin. In that expression he summed up himself, without knowing it, as able to exemplify in the years to come one of the profoundest facts of individual art progress — the capacity to go alone; to begin, keep on, in spite of every obstacle and discouragement, to correct his own efforts, to make continual progress, and finally to walk above the clouds, firm, and without impediment or danger, and in debt to no human professional influence.

The question of bread had now to be considered, and Rodin settled it by finding employment among the makers of plaster ornaments and the workers in *papier-maché*. If this secured him a living, it also cut off to a large degree his hours of study. And now his independence and perseverance took a more immediate practical shape, for, to gain time to continue his studies, he arose very early in the morning, and studied until he went to his employer at eight o'clock; at noon he swallowed his dinner quickly to gain half an hour, and when the day was done he again began studies that extended far into the night. Sundays, especially, were his great days. This habit of continued work and study he persistently followed for the next twenty-four years.

He wanted very much to go to the Ecole des Beaux-Arts, and he entered upon his first competition for a place in drawing and modelling at the age of seventeen. Neither the first nor the two succeeding competitions in modelling were successful, though in drawing he was accepted, but did not enter the class. As each competition embraced a period of six months, it was a year and a half before he knew that the privileges of the school, in the department he wished to enter, were denied to him. It was a terrible disappointment and a deep humiliation. Like every young artist, he indulged in the prevailing belief that such men as Ingres, Pérault, and Pradier were gods in art, to be loyally worshipped by every student. The course of study they had passed through he ardently wished to follow, and it was not until many years afterwards, when his work showed the freedom, boldness, and life of great individuality, untrammelled and unaffected by the influence of school or master, did he believe in the truth of the felicitations extended to him by Dalou, another eminent sculptor who had been through the school, that he was fortunate in escaping the kind of study taught in the school. "For," said Dalou, "it would have killed you."

But the time spent in the competitions was by no means lost. Before he had left La Petite Ecole he could draw from the living model almost as well as he ever could. He had unconsciously begun to develop his own way of seeing and working, and the competitions enabled him to compare what he could do with the work of the students who had succeeded in being accepted. He also saw, for the first time, that his drawing and modelling were different from that of other pupils, and that they watched him and his work with much curiosity and attention. Why his work was not as good as that of the more fortunate competitors he did not know, nor could he explain the difference between theirs and his own. He now remembers that his "things were well constructed, perhaps a little dry, but the bones were there."

Rodin soon found out that the difference between himself and other young artists was leading him into an unknown and dreary path, where he was destined to travel alone for the next twenty years deprived of all professional sympathy and companionship.

He also managed at this time to go to the evening drawing-school at the Gobelins manufactory of tapestry, and with especial satisfaction, because the model posed three hours at one time, whereas at the Government School the pose was for only two hours. Besides, he attended Barye's class at the Jardin des Plantes, and although he saw and got very little there apparently, he felt later on the result of what he had instinctively acquired. Of Barye, Rodin says: "He talked very little, and I saw nothing in him at that time." "But the three years at La Petite Ecole was the germinating period of my life, where my own nature planted itself on firm ground without let or hindrance; where the seeds of my subsequent development were sown; and where I received the only instruction in my life."

The work that Rodin was obliged to do for his employers was of the most menial description. He mixed plaster, cut off the mould-marks from plaster and *papier-maché* casts, performed the general duties of a scullion in such establishments, and made occasionally a simple ornament, for all of which he received the luxurious salary of forty cents a day. He hated his work and his employers, and they returned his sentiments by hating him and finding fault with everything that he did.

He continued to serve men of this kind for six years, passing through the most horrid moments of his life, and retaining the memory of such bitter experiences with them that to this day he will not speak some of their names. In his spare hours, however, he was himself, and enjoyed the pleasure of doing as he pleased. His little sleeping-room was also his studio — more the latter than the former — and there he modelled and drew from life to his heart's content. As soon as he could he got a hole somewhere else — a shed, cellar or stable, no matter how miserable — that he could more properly call his studio. He invariably attempted some figure larger than life as the principal object of his thought, but had always numberless sketches in various degrees of execution as a sort of momentary enjoyment. Being somewhat negligent, and without means either to care for or preserve these sketches and finished models in plaster, they dried up, fell to pieces, and went into the clay-tub, to continually appear again in other forms, and to follow the same round of resurrected destruction.

While Rodin occupied, in the Rue de la Reine Blanche, a stable as a studio, he began to make, and finished in about eighteen months, a mask which was destined to result in one of the most sculpturesque pieces of modelling of modern times, and which is now known as "The Broken Nose." It was made from a poor old man who picked up a precarious living in the neighborhood by doing odd jobs for any one who would employ him, and who went by the name of "Bébé." Of the great merits of this mask, some observations will be made in another place and in connexion with other of the sculptor's works; but, as the reader may have the same curiosity that the writer had, and ask why the sculptor should choose such a model, his answer is given in this place: "He had a fine head; belonged to a fine race — in form — no matter if he was brutalized. It was made as a piece of sculpture, solely, and without reference to character of model, as such. I called it 'The Broken Nose,' because the nose of the model was broken." And of its value to him, as a point attained and to be guided by, he further observes: "That mask determined all my future work. It is the first good piece of modelling I ever did. From that time I sought to look all around my work, to draw it well in every respect. I have kept that mask before my mind in everything I have done. I tried it on my first figure, 'The Bacchante,' but did not succeed; I again tried it on 'The Age of Brass,' also without success, though it is a good figure. In fact, I have never succeeded in making a figure as good as 'The Broken Nose.'"

"The Bacchante" was Rodin's first large figure, made about the same time as "The Broken Nose," and upon which he spent nearly three years. As he now remembers it, he says, that "in style of modelling it was like 'The Broken Nose,' and better than 'The Age of Brass.' Very firmly modelled — possibly a little cold." He thought it a good piece of work at the time, though every one who saw it was displeased. So solidly was the clay put together, so severely and endlessly was it modelled, that when it had dried and shrunken up to its smallest dimension, it retained its proportions in every particular. In making this figure the sculptor was more than ever powerfully influenced by the increasing domination of his feeling for pure sculpture — the question of lines, masses and effects; of *drawing* his model in the severest sense of the term. The subject, as such, occupied no place in his mind. It was, with him, then, and ever afterwards, the never-ending and all-imposing problem of *planes*. The sculptor speaks of "The Bacchante" with a feeling of deep regret because he was not able to preserve it, and with sadness when he remembers the long hours of patient and suffering labor that the figure cost him.

Among Rodin's friends was a priest, named Aymar, the founder of a society called The Sainted Sacrament, and who had summed up the experiences of his life and observation, in the expression — which he enjoyed repeating — that "Life was an organized lie," and he wanted his bust made, in some respects, in accordance with this conclusion. Rodin gladly consented to make it as he saw his sitter, and the more willingly because it would enable him to earn a little extra money, and this meant a little more human comfort. After the bust was completed and several duplicates made, of reduced size, Aymar took the sudden fancy that the masses of hair on the sides and top of his bust suggested to him the "horns of the devil," and he would not accept it unless these troublesome reminders were reduced to a more human appearance. This the inflexible young sculptor would not do. The facts of Nature had more influence with him than the desire to please the fears of the superstitious priest. Besides, the head had a certain interest to Rodin. Aymar was a born Jesuit, his head and face gave no indication of its owner's age, and it had a character that the sculptor liked to study. But, the priest was a poor sitter, and in spite of all he could do, Rodin could get very little of the kind of modelling he had put in "The Broken Nose," though he caught the character of his sitter with force and

vigor. The result was that Aymar would not take the bust nor pay the sculptor for the time he had expended on it, nor the money he had paid out for the duplicates. The modelling of this bust taught the priest that there was one exception, at least, to his favorite expression. So much did Rodin need the money at this time, that the amount he had paid for redneing and duplicating this bust was a matter of serious importanee to him, and caused him considerable subsequent privation.

The sculptor was now, 1862–3, working for an ornament-maker by the name of Bies, whose shop was in the same street with Rodin's studio, and although he never pleased his employer, he was slowly winning praise from his fellow-workmen as an adroit draughtsman. In the shop, as well as at home he was always drawing, and as frosted-windows were his peculiar delight, he regaled his comrades in cold weather with imaginary images that excited their wildest astonishment and extended his reputation with them, as a being they could not understand. But Bies, even with "The Broken Nose" before his eyes, could not see anything in his workman but a wilful maker of strange ornaments that he could not use.

Rodin was also making jewelry for a noted Paris manufacturer, Fanières, in the form of ear-rings and buckles, of the smallest possible dimensions. They were modelled in hard wax, and made with all the skill and exactness that he was able to put upon them; but they did not please Fanières. To better his condition Rodin made several ineffectual attempts. In 1863, there was in Paris a private art-club called by the high-sounding title of "The National Exhibition of Fine Arts," which was directed by M. Martinet, and included in its list of members, Ingres, Delacroix, Baudry, Carpeaux and nearly all the principal artists of the city. Hearing that Martinet was very friendly to young artists and much disposed to give them a word of encouragement, or do them an act of kindness, Rodin went to him to see if he could be made a member of the club. The director put the young aspirant through a kind of examination, and came to the conclusion that he was eligible. From time to time the club gave private exhibitions of the works of its members, preceded by a banquet, and Rodin brought up, on one of these occasions, as the sign manual to his right to sit down with the mighty men into whose presence he was now to enter, his bust of "Aymar." To his great comfort it was much admired, and he felt, for the first time in his life, that there was a ray of light not unwilling to fall upon his head. If he could only have courage to bring "The Broken Nose" to the next dinner!

But before that patiently awaited for event was to take place the club was dissolved. During his short membership he had seen face to face the great lights of French art, and been introduced to Dumas *père* and Théophile Gautier. Being a great admirer of Carpeaux, he ventured, timidly at one of the club meetings, to speak to him, and ask him if he would give him work and take him into his studio. To Rodin's great joy Carpeaux responded in the most cordial manner: "Certainly! Come when you please." It may be imagined that he did not wait long before presenting himself at the latter's studio, but, to his sad astonishment, Carpeaux received him coldly, almost brutally, and he left without any disposition to return at a more propitious moment.

One of Rodin's comrades was a native of Marseilles, and after completing his studies in Paris he returned to his native city and undertook the execution of a large amount of stonework, on public buildings, for the Government. Needing some skilled assistance he sent for Rodin, and the latter set out for the shores of the Mediterranean; taking in on his way the interesting cities of Arles, Vienne and Nismes. Glad enough to get out of Paris, visit places as enjoyable as the more famous ones of Italy, and earn his bread under circumstances which he anticipated would be more agreeable, he set to work with the liveliest enthusiasm; but it was a delusion of short duration. He interpreted the model, which he was reproducing in stone, very differently from the way that his comrade expected. He cut too much off in some places, and left too much on in others. In fact, he was not the kind of workman that his employer wanted, and so he was discharged. Not desiring to immediately return to Paris, he obtained work at his old trade, ornament-making. Neither did this last long, two or three weeks of an individual Parisian was enough for the warmer-blooded inhabitant of the Phœnecian settlement, and Rodin packed his bundle and turned his footsteps towards home. But he had no sooner arrived than he was asked to go to Strasbourg, by a manufacturer of church sculpture, or, what is known in the vocabulary of sculptors as a *marchand de bons dieux*, a class of men not held in good repute among artists for any reason, but for whom many young sculptors are obliged to work to get their living. This one had, however, a slight recommendation of superiority for Rodin, because he followed a Gothic style of sculpture, of which, in its purity, the latter is an enthusiastic lover. He remained in this city three months, and one day, while enjoying the festivities of a grand church celebration, when thousands of fair women and young girls were filling the streets with their beauty and pretty costumes, he saw a little head which pleased him so much that he went to his room and modelled in an hour or two "La Petite Alsacienne."

The six years before referred to were now coming to a close, and in all that time Rodin had received nothing but reproaches from his employers, and not a word of encouragement from those who had seen his busts, sketches and figures. The truth is, he had altogether too strong a nature and too much artistic intelligence to have any satisfactory relations with the class of men he was obliged to serve. He would not swerve a hair to please any one in his work. Instinctively he felt that Nature was the best guide and master, and he followed her with unchanging faithfulness and at whatever cost. It is also true that his genius as an artist was not of that sort to recommend him to ornament-makers or commercial sculptors. The kind of modelling he did was too robust for the petty requirements of such employers.

There was also in the Rue de la Reine Blanche, a photographer, named Aubry, who possessed a good deal of appreciation of art, especially as it concerned his own profession. He knew Rodin, felt kindly disposed towards him, and had the unique impression, among all of the sculptor's acquaintances, that the latter might possibly get something to do for a higher class of employer than those he had been working for. He, therefore, asked Rodin to go with him to see Carrier-Belleuse, the most extensive commercial sculptor in Paris. The result of the visit was, that Belleuse came to Rodin's studio, examined his work, particularly "The Broken Nose," and told him that he would give him employment. "I was very happy," says Rodin, "To go to Belleuse, because it took me away from an ornament-maker to one that made figures. I began to work for him in 1863, and remained until the breaking out of the Franco-German War; although, at first, I only worked in the afternoons, continuing with Fanières in the mornings."

T. H. BARTLETT.

[To be continued.]

THE LEAGUE EXHIBITION.[1]—II.

WE should forget one of the most satisfactory drawings in the exhibition if we passed over Mr. C. C. Haight's pen-and-ink sketch, No. 24, for a vestry, offices and schools, a subject in which notwithstanding its difficulty, he finds himself thoroughly at home. His sketch for a church, No. 164, is much less praiseworthy, either in design or drawing, but at its best Mr. Haight's work is quiet, well-studied and poetical, to a degree which few architects in this country surpass. For an illustration of sentimentalism, as opposed to real sentiment like Mr. Haight's, we could hardly have anything better than the works of Mr. A. Page Brown, which are shown in different places on the walls. Mr. Brown appears to be a conscientious person, who studies architecture by reading what some one else thinks about it, instead of doing any thinking of his own, and who has just had his mind stuffed with the rhapsodies of the people who admire Greek architecture on account of its "intellectual coldness and purity," their notions on the subject being derived from the present aspect of Greek temples, which is about as much like the harlequin gorgeousness which their builders bestowed upon them as the grin of a mummy is like the smile of a Theban princess. Being, however, for the moment convinced that coldness and purity are the correct thing, Mr. Brown can think of nothing better, when he is requested to design a tomb, than to present a bird's-eye view of a little Greek temple on a big marble platform. As this would, under ordinary circumstances, look merely like a small school-house from the rural districts, he has had the happy idea of differentiating it from a school-house by presenting it as it would appear to one hovering in the air over it, with a wealth of hills and woods and other things in the distance. As district school-houses are rarely observed from a position in the air above them, whereas the mind's eye is quite accustomed to soaring over Greece, the classic illusion is happily preserved, and is cleverly heightened by making the landscape generally purple, it being well known that Grecian topography presents that color to sentimentalists.

In another effort, No. 172, Mr. Brown has, let us say, assimilated the Caryatid portico of the Erechtheum into a design for a man-

[1] Continued from page 17, No. 681.

solemn; that is, he has not copied it so exactly that the imitation is indistinguishable from the prototype, since we see marks of originality in the addition of wings to the caryatides, and in leaving out the frieze from the entablature, making it consist of a dentilled cornice, placed directly on a huge three-faced architrave. We cannot say that either of these innovations appears to us an improvement, and are not consoled by finding the name of Mr. St. Gaudens, imperfectly spelt, associated with that of Mr. Brown in the legend on the drawing. When Mr. Brown gets out of the Grecian vein, as in his sketches for country houses, we find him much more agreeable, as is usually the case with people who mistake archæology for an art.

The bird's-eye view seems to be acquiring an undeserved popularity among sketchers. In No. 34 we find an etching of Milan Cathedral, by Mr. Otto H. Bacher, which would be very creditable, if the point-of-sight had not been taken from about the level of the third story windows of the houses on the opposite side of the Piazza. It is true that the photographs of the cathedral are often taken from this point, to avoid the convergence of the vertical lines caused by tilting upward a cheap camera, but the result is that the building looks in the picture like a small model, set down in a hole. Very probably Mr. Bacher copied his etching from such a photograph, but it would have been worth while, before spending so much labor on it, to have translated the perspective, so that the building should appear as high above the eye as it really does to a person standing on the ground in front of it, instead of destroying the dignity of the picture by showing the object as it would appear to a giant fifty feet high. In another, but less successful etching of the Church of the Holy Sepulchre, at Jerusalem, Mr. Bacher exhibits the same fancy for belittling his subject by magnifying his spectator, which we hope a careful study of Piranesi, Bourgerel, Prout, Haig and the other first-rate engravers of architectural subjects will induce him to correct in time.

There may, perhaps, be a certain advantage in considering the sketches of old work, as distinguished from the modern designs, by themselves, for in no department of the exhibition is there more variety, and in no department, perhaps, do we find works of such merit. At the very head we must certainly place Mr. F. H. Bacon's "Sketches in Greece and Asia Minor," No. 101. These are just a little stronger and better than the ones previously exhibited, and seem to us the finest pen-and-ink architectural sketches ever made. In saying this we remember perfectly the melting beauty of Mr. Raffles Davison's best work, and it is quite possible that Mr. Bacon would have failed in rendering Davison's subjects, but fortune willed that Mr. Bacon's quiet precision of eye and hand should be exercised on the brilliantly lighted but barren landscape of the East, rather than on soft English views, and the result is greatly to the advantage of the American sketcher. Next to Mr. Bacon, leaving out of consideration Mr. Pennell's work, which has a different object, and should hardly be considered among the sketches, and Mr. Kirby's drawings, which are rather works of imagination than records of fact, we should put a group of three sketchers, all of them uneven, but all very good when at their best — Mr. Arthur Rotch, Mr. A. W. Brunner and Mr. Schweinfurth, adding perhaps Mr. Schladermundt.

Mr. Rotch's color drawing of the Church of San Pablo, at Seville, is quite a model of an architect's water-color sketch. Close after these gentlemen, and a long way in front of the people who, like some, whose names we will not mention, make splashy caricatures of buildings, which shriek from the walls for us to admire them, come the conscientious students, like Mr. T. H. Randall, whose frame, No. 57, of Italian sketches in color, is so earnest and true that we easily forgive a little crudeness in our gratitude to the artist for allowing us to think of his subject instead of him.

Returning from Spain and Venice for a little while to the nineteenth century of American architecture, we have a few exceptions to the rule of creditable, but not remarkable designs and drawings, which should be noticed. The most curious sketch in the room is perhaps one by Mr. Sydney V. Stratton, No. 77, of a house at Natchez, executed in pastel. Now, pastel has its uses, but we feel ourselves compelled to say that the rendering of hasty architectural sketches does not appear to be one of them, and even so agreeable a design as Mr. Stratton's fails to charm when set in a coarse landscape of emerald green with two rectangular patches of vermilion in the foreground. This is not the only illustration in the room of the fact that color, in architectural drawings, is a dangerous thing, and that those who are not sure of using it well had better let it alone. As particularly good examples to enforce this moral, we might mention Nos. 87 and 180. The former is a water-color drawing of Mr. Arthur Little's room in Boston, by Mr. G. P. Fernald. It is faithful, with a faithfulness that would do credit to Old Dog Tray, and it need hardly be said that the detail of the finish and furniture in the room of so accomplished an architect is all interesting, but the very completeness of the rendering takes away from its charm, and one cannot help criticising the contrast of color between the sofa and the big chair, and doubting whether so much brown in the oak wainscot ought not to have been balanced by stronger decoration on the ceiling, and so on; and the net result of the inspection is one of mild discontent. No. 180, on the other hand, which is a mere outline sketch, in black-and-white, of "An Old Colonial Hall," by Mr. Frank E. Wallis, attracts us at once.

The design is beautiful, both in arrangement and detail, though perhaps, no more so than Mr. Little's work, but the firm simplicity of the drawing, showing with precision what it wishes to insist upon, and leaving us to infer the rest from what we see, without distracting us by irrelevant accessories, certainly leaves most persons with the impression that it represents much the more successful design of the two. The late Mr. Richardson, who was a keen observer of the conditions of success or failure in competitions, was always prejudiced against colored drawings. Until his success in the Trinity Church contest, which he won with drawings very slightly tinted, he was accustomed to say that he had never gained a competition to which he sent colored drawings, and never lost one to which he sent a perspective in pen-and-ink. According to his view, it was a mistake to render a drawing so fully as to leave nothing for the imagination of the spectator to supply. Even with coloring so good as to be in no danger of offending any one, he believed that the average jury, even though composed in part of experts, was disposed to fear that a mild deception was being practised on them, and that the building in execution "would not look so handsome as the picture;" while a pen-and-ink drawing impressed most persons as an inadequate medium for representing the beauties of the design, and jurymen, in contemplating it, would, as he found, say to each other, "If a mere sketch looks so well, what must the actual building be!"

It would, however, be unfortunate to carry this principle too far. While Mr. Richardson's maxims would apply with full force to drawings like an extraordinary one rendered in color by Mr. Eastrup for Messrs. Burnham & Root, representing a bank building, in which we find the windows represented as glazed in lead-work on a scale so colossal that the disappointed depositors, who are shown gathering in groups about the doorway, could easily crawl through the space made by the removal of a single quarry, it is certain that in Mr. Peabody's lovely little color sketches, showing a house at Brookline, a church at Weston, Mass., and three studies for a church at Pittsfield, the design gains much from the rendering. Perhaps as sketches the church drawings are the most effective, but the study for the house — Mr. White's, is so full of the sweetest charm of peace and home that we are very much inclined to rank it, slight as it is, as the best specimen of architectural expression in the exhibition, and one of the best ever shown in New York.

With these, as shining examples of that rare and precious quality, architectural expression, should be mentioned Mr. H. P. Kirby's drawings, of which a dozen or so are collected on a stand near the door. Our readers know our opinion of Mr. Kirby's compositions, so we need say no more than that in some of those here shown he is at his very best. A few are sketches from old French towns, in which he seems to revel in picturesqueness and contrasts of light and shade, while the others are mostly compositions of his own, more picturesque even than French nature, and delicious in their indications of detail. Why it is that we do not see some of Mr. Kirby's conceptions carried out, we cannot imagine. There seems to be nothing about his "Courthouse Tower," or his "Country Tavern," which is not perfectly adapted to modern requirements, and either of them has architectural novelty and beauty enough to endow a whole American town with those qualities, yet they appear to remain unfruitful. We cannot say quite as much for his sketches for a Moorish "Casino" as for the French Gothic and Transition work, but in the latter, as well as in compositions too simple to be of any style, and depending purely on picturesqueness, his sketches, at least, are unrivalled. To have them lost, even as sketches, to the architectural world would be a serious misfortune and we trust that, before it is too late, some one will see to it that a complete collection is made of the works of this American Prout.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

ENTRANCE TO THE HOUSE OF C. L. TIFFANY, ESQ., NEW YORK, N. Y. MESSRS. McKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATES 37 AND 38. — CANTERBURY CATHEDRAL; ST. MARY MAGDALENE, NEWARK, ENGLAND.

[Issued only with the Imperial Edition.]

THE AGE OF FRANCIS I, PLATE 1. — CHAPEL OF ST. HUBERT, AMBOISE.

[Issued only with the Imperial Edition.]

"THE AGE OF BRASS"; "THE BROKEN NOSE"; "PERE AYMER." M. AUGUSTE RODIN, SCULPTOR.

See article elsewhere in this issue.

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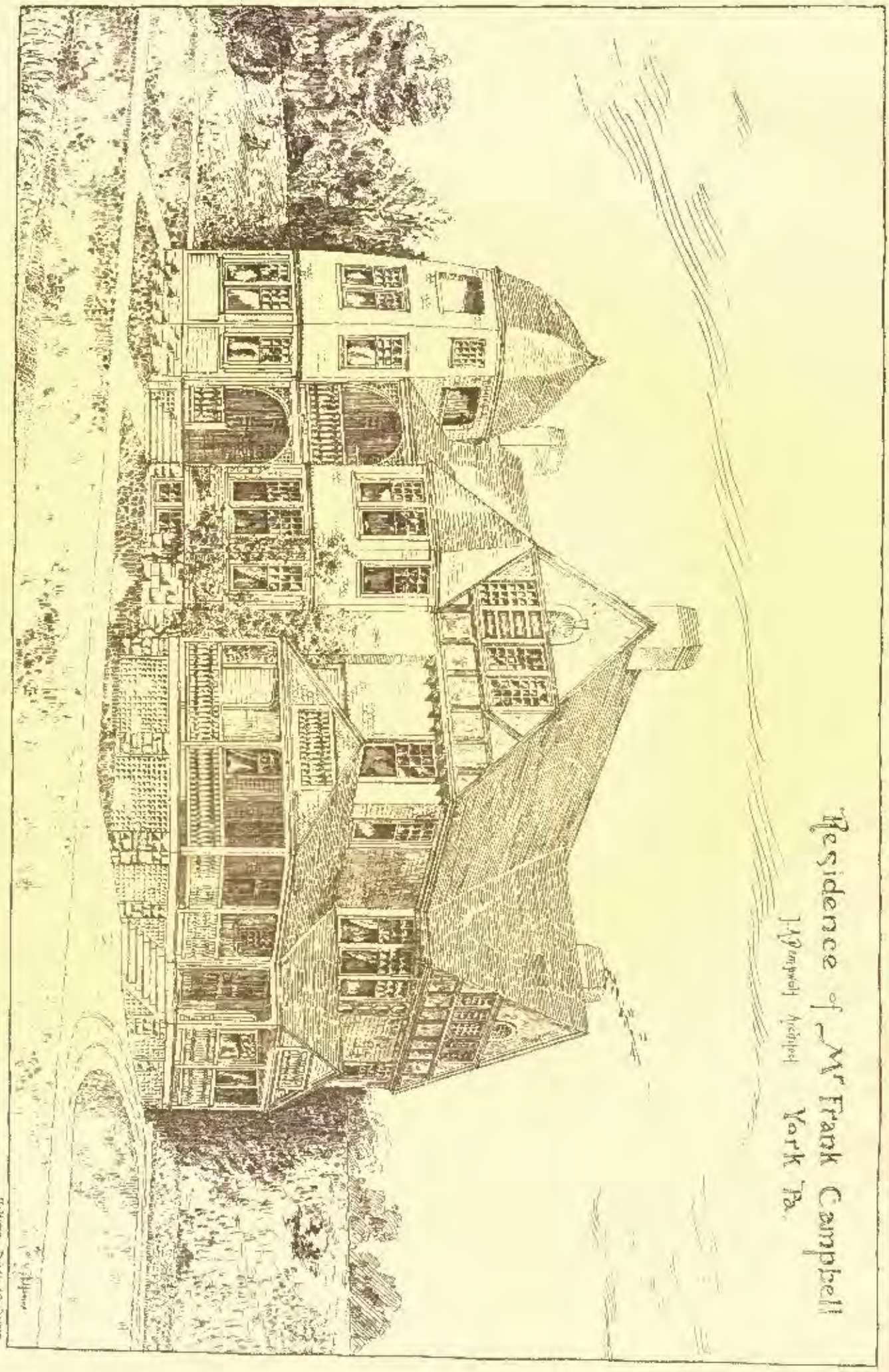

Heliotype Printing Co. Boston

Pl. 1

Heliotype Printing Co. Boston

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Heliotype Printing Co Boston.

THE HIGH ALTER CHURCH OF GUADALUPE, MEXICO.

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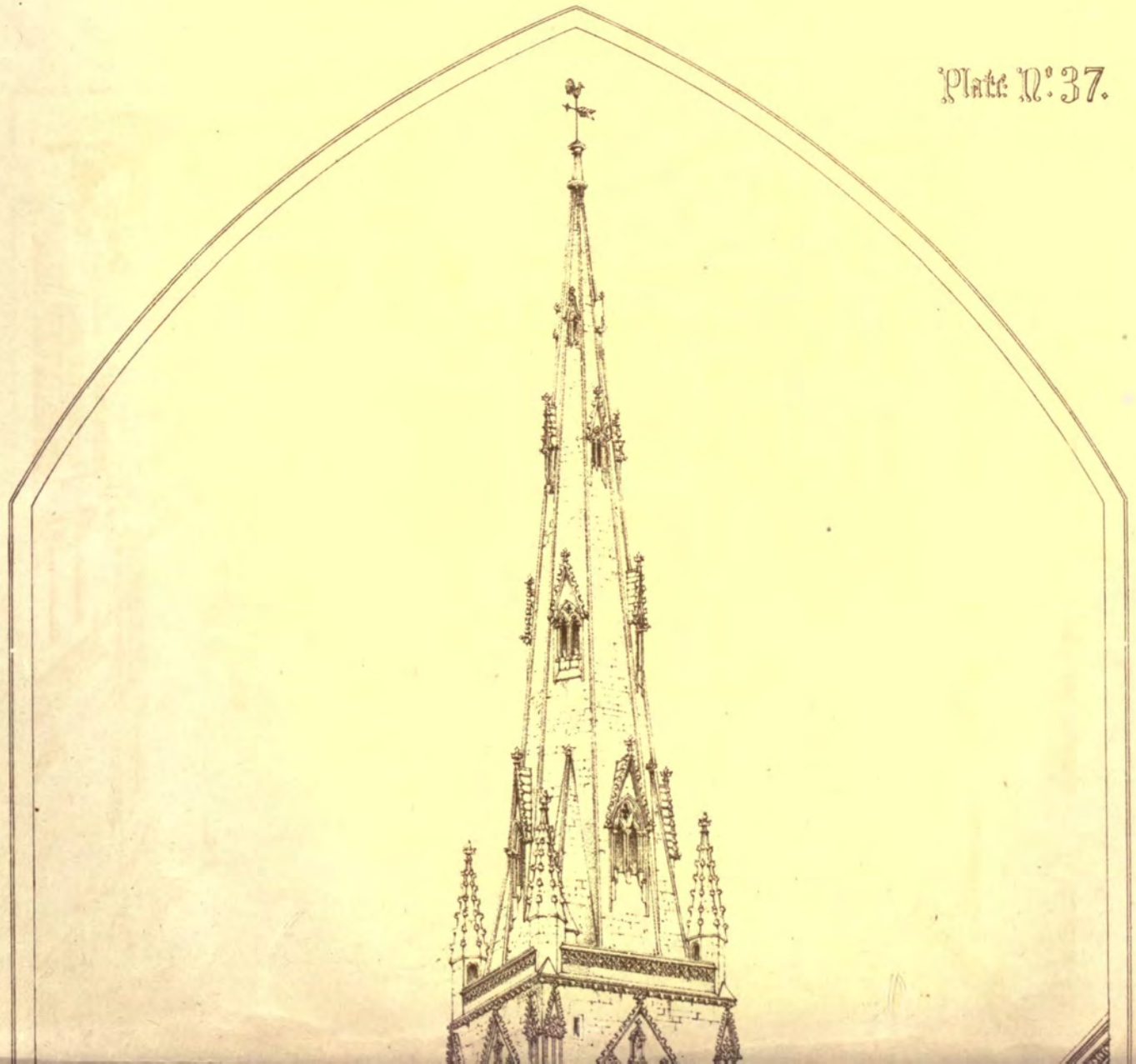
Plate N.° 37.



Saint Mary Magdalene, Newark.

Nottinghamshire.

The American Architect and Building News, January 19, 1889. No. 652.

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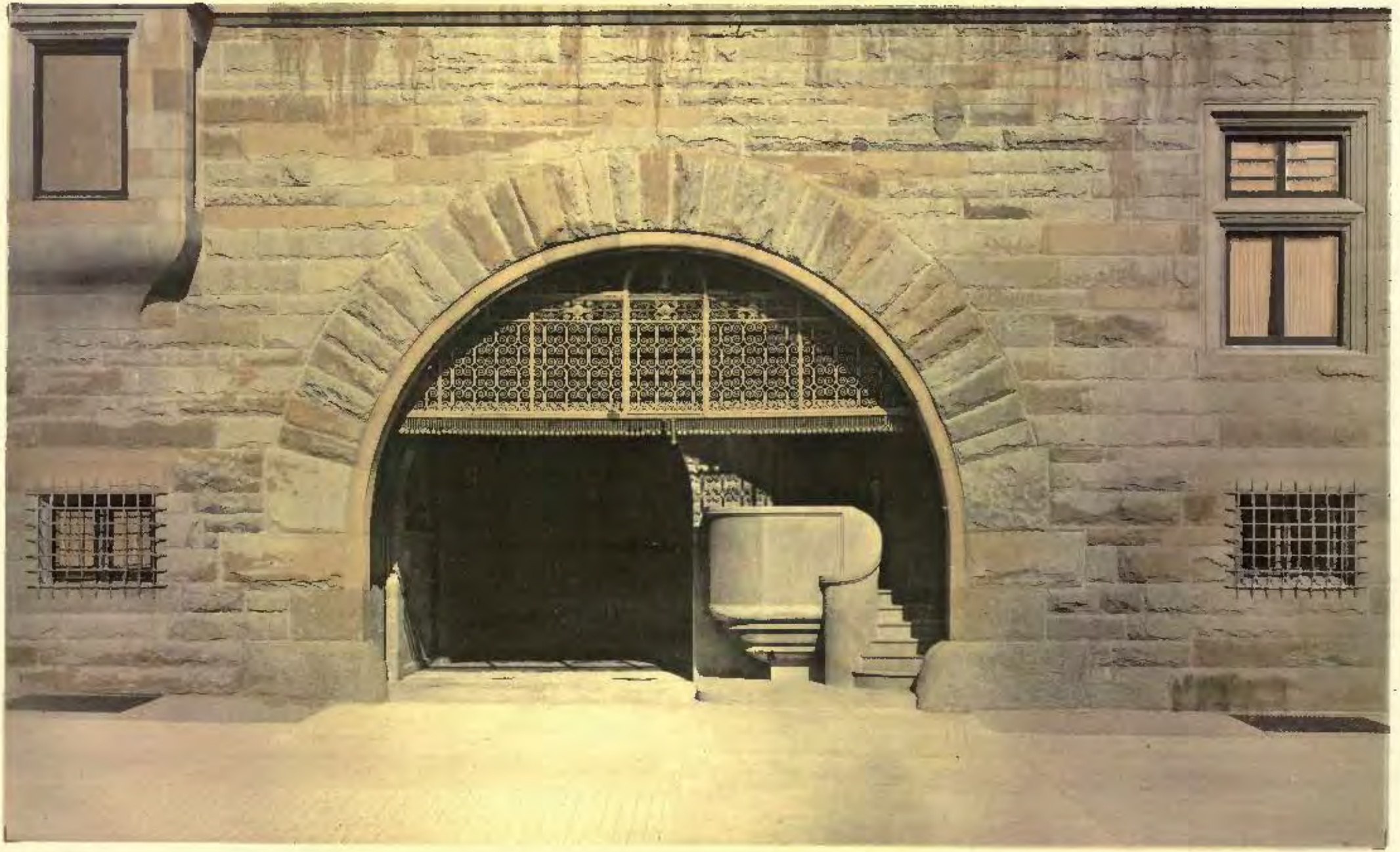
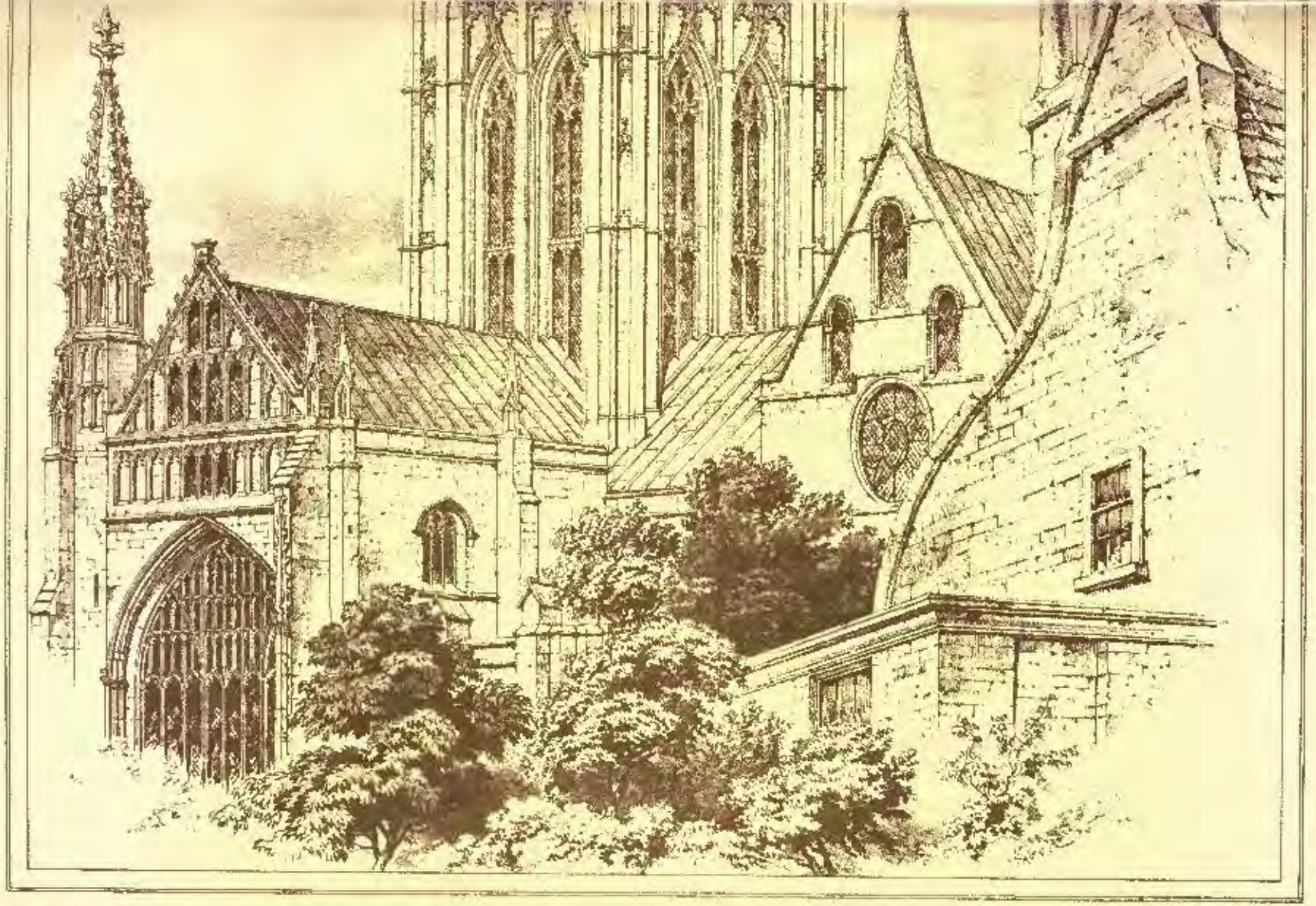


ENTRANCE TO HOUSE OF C. L. TIFFANY, ESQ., NEW YORK, N. Y.

McKIM, MEAD & WHITE, Architects

Plate N° 38.



Heliotype Printing Co. Boston

The Cathedral, Canterbury,

Kent.

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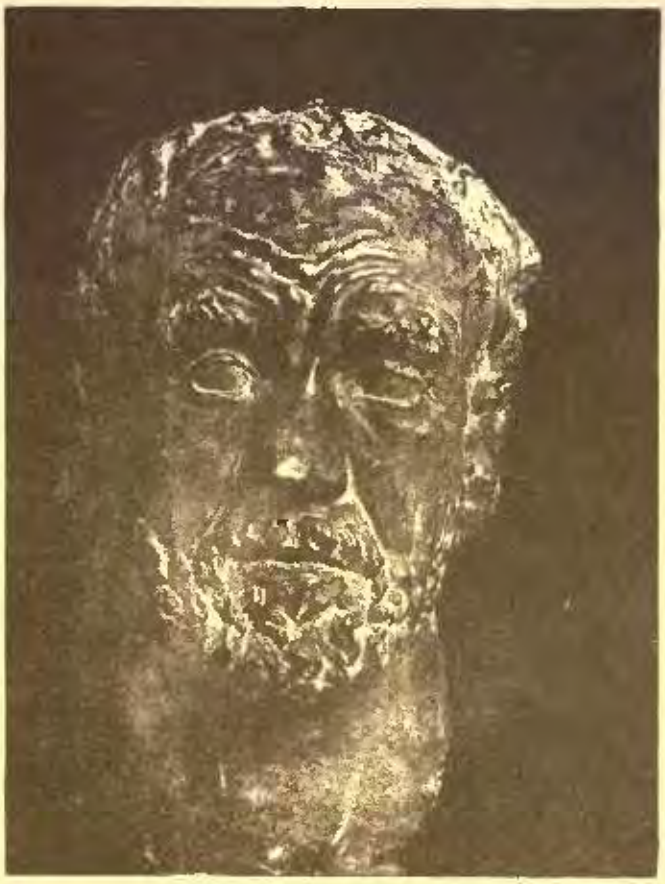
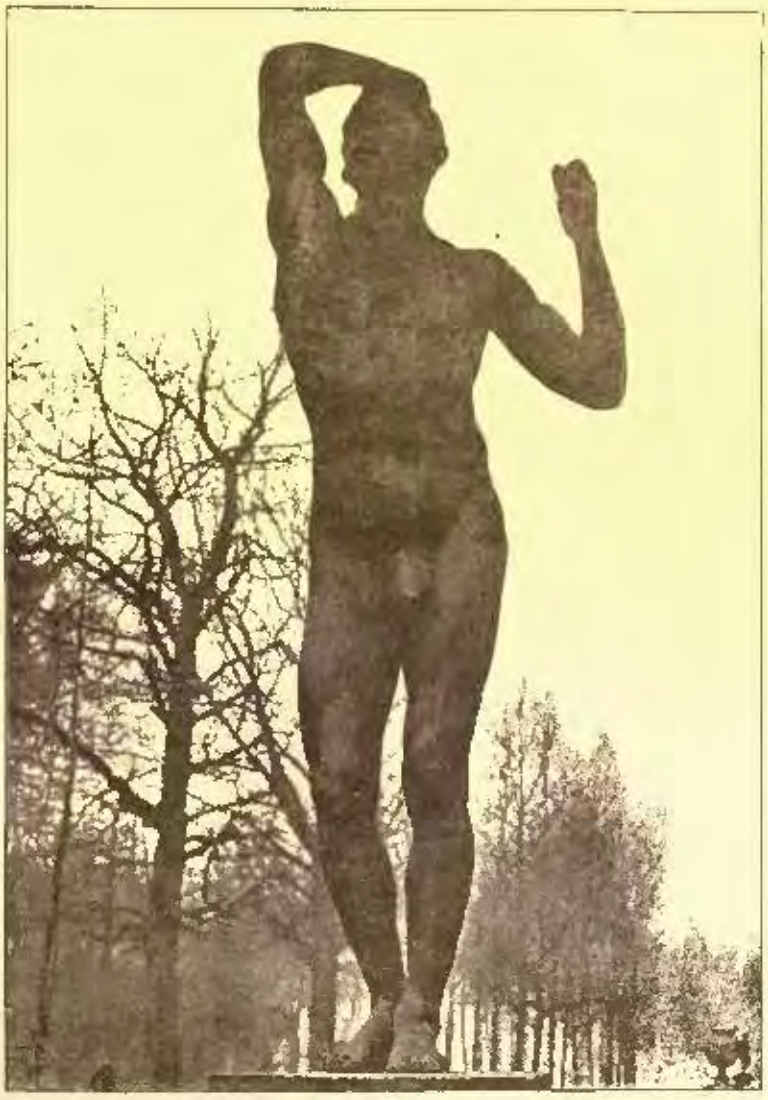
"PÈRE AYMER"



"THE BROKEN NOSE"



"THE AGE OF BRASS."
AUGUSTE - RODIN SCULPTOR.

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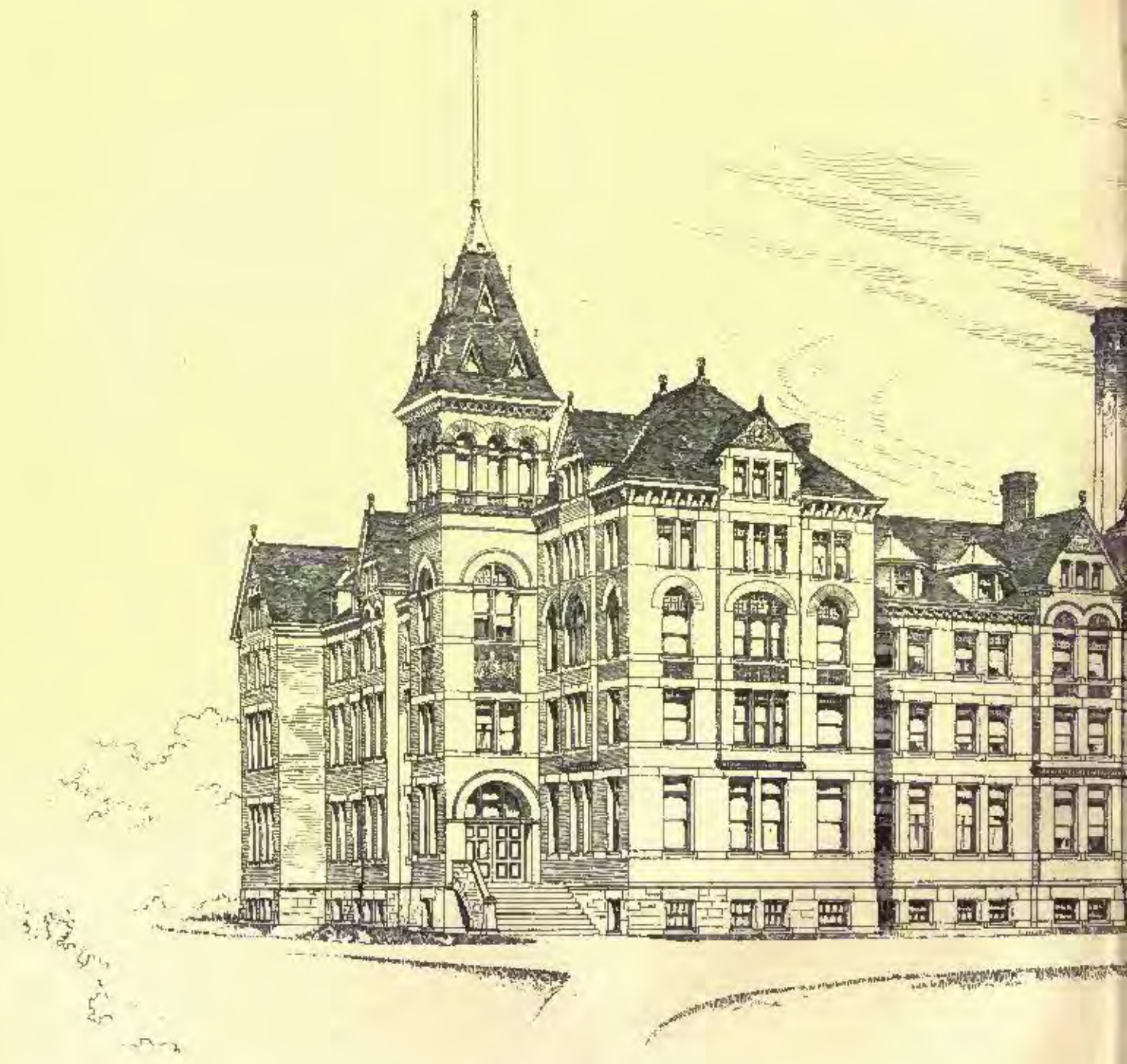

· UPPER CANADA COLLEGE ·
· TORONTO · ONTARIO ·
· GEORGE P. DURAND · ARCH'T · LONDON, ONTARIO ·

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BUILDING OF THE BELL TELEPHONE CO. OF MISSOURI, ST. LOUIS, MO.
SHEPLEY RUTAN & COOLIDGE, ARCH'TS

GRAND ALTAR IN THE CHURCH OF GUADALUPE, MEXICO.

HOUSE OF FRANK CAMPBELL, ESQ., YORK, PA. MR. J. A. DEMPWOLF, ARCHITECT, YORK, PA.

BUILDING FOR THE BELL TELEPHONE COMPANY OF MISSOURI, ST. LOUIS, MO. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

UPPER CANADA COLLEGE, TORONTO, CANADA. MR. GEORGE F. DURAND, ARCHITECT, LONDON, ONTARIO.

A GENERAL PROTEST AGAINST IMPROPER CONDITIONS OF COMPETITION.

[ARCHITECTS in every part of the country are invited to send us their authorization to add their names to the protest. — EDS.]

WHILE fact that the Committee on Finance, to whom the following resolution was referred by the Massachusetts Senate, reported on Monday last that it "ought to pass" may be taken by the profession as a distinct encouragement and should induce all architects to uphold each others' hands in all similar cases.

The resolution prepared by Mr. Kittredge of Boston, from the Committee on the State-House, which will probably now be passed before this issue reaches our readers is, as follows:

Resolved, That there be allowed and paid out of the Treasury of the Commonwealth a sum not exceeding $8,000, to be expended under the direction of the Governor and Council, to enable them to devise and report to the General Court in the month of March, 1889, a general plan for the use, occupancy and improvement of any land acquired or taken for State purposes, including the present State-House grounds, and for the alteration or enlargement of any existing buildings or the erection of any new buildings thereon, it being hereby provided that the architects presenting the plan which shall be adopted by the Legislature or by its authority shall be employed to superintend the construction of the building designed in such plan, on terms to be agreed upon by the Governor and Council; and it being further provided that $500 of the above named sum may be expended under the direction of the Governor and Council to enable them to employ experts to advise them in deciding upon the merits of plans which may be submitted.

Resolved, That chapter 92, Resolves of 1888, is hereby repealed, provided that any bills contracted under the authority of said resolve may be paid out of the amount authorized herein.

BOSTON, MASS., December 18, 1888.

THE Commonwealth of Massachusetts has, by its Commissioners, advertised for designs for the State-House extension, said designs to be furnished in open competition. The conditions of the competition, as announced, have evidently been framed without due regard to the best custom in the conduct of such matters, the sole end and aim of which should be to secure to the State the best service by making sure that "the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected; and that the author of the successful design shall be employed as architect, provided the building is built and he is competent."

The conditions announced are faulty:

First. In that they are not drawn up in accordance with the best custom, and no assurance is given that an expert adviser will be employed to aid the Commission in their choice.

Second. That no assurance is given that the successful competitor will be employed, but, on the contrary, it is distinctly stated that all premiated competitors are to relinquish all ownership in their plans to the State, without any further claim to compensation or employment.

Third. Even if the first prize in the competition were as it should be, the execution of the building, the actual prizes offered would still be entirely insufficient compensation to the authors of the drawings placed second and third.

For the above reasons, we, the undersigned architects, citizens of the State of Massachusetts [and elsewhere], protest against this form of competition, which, in our opinion, is not for the best interests of the State or of our profession, and we therefore decline to enter it:

BOSTON, MASS.
Cabot, Everett & Mead.
Wheelwright & Haven.
Joseph R. Richards.
John A. Fox.
Geo. H. Young.
E. A. P. Newcomb.
Longfellow, Alden & Harlow.
Edwin J. Lewis.
Andrews & Jaques.
H. Langford Warren.
Walker & Best.
Wm. Robb Ware.
Hartwell & Richardson.
Cummings & Sears.
T. M. Clark.
Allen & Kenway.
Rand & Taylor.
Thos. O'Grady, Jr.

BOSTON, MASS.
Sturgis & Cabot.
Shepley, Rutan & Coolidge.
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THE NUMBER OF ILLITERATES.—A census of the illiterates in the various countries of the world, recently published in the *Statistische Monatsschrift* places the three Slavic States of Roumania, Servia, and Russia at the head of the list, with about 80 per cent of the population unable to read and write. Of the Latin-speaking races, Spain heads the list with 63 per cent, followed by Italy with 48 per cent, France and Belgium having about 16 per cent. The illiterates in Hungary number 43 per cent, in Austria 39, and in Ireland 21. In England they are 13 per cent, in Holland 10 per cent, in the United States (white population) 8 per cent, and in Scotland 7 per cent. Among the purely Teutonic States there is a marked reduction in the percentage of illiterates. The highest is in Switzerland, 2.5; in the whole German Empire it is but 1 per cent; while in Sweden, Denmark, Bavaria, Baden, and Würtemburg there is practically no one who cannot read and write.

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1]—III.

Vera Cruz, Mexico.

AN archæological camp proves to be a very busy place, although it seems a very region of *dolce far niente*, under the serene sky, on the wide and silent soulit plains basking in the sunlight. The landscape is a picture of peace. All nature is enjoying a delicious repose. No hum of insects is heard in the bright and quiet air. The ground is brown and bare; even the withered herbs have nearly all crumbled into dust and been scattered in the wind, leaving the brown plain bare and baked. The warm sun of the days cannot yet call forth the plants from the sleep induced by the cold of the night-time; only the brave blades of the grain have the strength to thrust themselves up, little by little, day after day, farther and farther into the air, until March sees them undulating like seawaves over the broad fields, their bloom showing foam-like and creamy green, while mid-April finds them golden and ready for the harvest. The brooding calm seems emphasized by the few glimpses of animation, the few sounds, that at intervals strike the eye or greet the ear; the scurrying rabbits, the timid little cotton tails and the great jack-rabbit with his enormous ears and astonishingly long leaps; those pretty creatures, the "*jumeritos*," which word means "Johnnies," rat-like and squirrel-like, with long tails terminating in a tuft of hair like those of shaven poodles, and wee ground-squirrels dodging into their holes with which the ground is everywhere burrowed into a honeycomb that keeps horsemen warily on the lookout when dashing across country; that humorous fellow, the coyote, skulking among the brush or sauntering indifferently along a few dozen feet away when he seems to know you are not armed, making night anything but musical with his yelpings; and the birds that hover around, some with exquisite musical notes, and the numerous flocks of quail with their queer crests perked forward and looking like some prize carried in their bills, evidently aware that their meat is as dry and tasteless as sawdust, for they run across the roads as indifferently as barnyard fowl and rarely take wing.

But while Nature and her children are taking their ease, Camp Hemenway is well occupied. The laborers have early gone afield to carry out the instructions that Mr. Cushing has dictated to his secretary the night before; the two doctors are out with them looking after the skeletons of the Ancients; Mr. Hodge is at his desk in his neatly-kept tent writing out his notes or busy with the accounts; Don Carlos is looking after practical affairs, turning out some needed carpentry at the bench under one of the mesquite trees, or is on the way to Phenix for supplies, or is at work on his surveys, while Mr. Cushing is out keeping the run of the work on the excavations, photographing the finds *in situ*, elated over some interesting discovery and drawing inferences therefrom in the light of his manifold ethnological experiences, ranging the plains in the saddle or on the buckboard with eyes alert for the slightest traces of ancient landmarks, or in his tent finding comparisons among his books or among his old notes that throw new light on fresh observations, or writing or dictating the daily reports that preserve accurate records of the work as it progresses. All this in the intervals left him for work by the delicate condition of his health, and often accomplished only by dominating over keen pain by the mastery of a strong will.

The ladies also are by no means idle, even a camp providing abundant domestic cares for Mrs. Cushing, while Miss Magill spends the day at her easel over the beautiful water-color drawings which she is making of all the important articles in the collections, with conscientious accuracy, and to scale. Of the pottery, for instance, she makes two or more drawings of each specimen, one from the side and the other from above or below, or perhaps both, while in the case of the decorated ware she makes a drawing of each different motive in the ornamentation, affording many beautiful designs and hints for decoration which could well be availed of by architects and painters. This idea of giving in a painted band the motives of pottery design, adopted in the reports of the Bureau of Ethnology, originated, I believe, with Mr. Cushing and it is extremely useful in affording an understanding of the decoration, which, when seen on the vessel appears often so complicated as to be difficult to elucidate, while, by presenting the motive alone it is made clear.

Another busy man in camp is the cook, who has a difficult task in suiting the appetites of so many, some of whom have been made dyspeptic by the exigencies of desert fare. Cooks in camp appear to maintain the reputation of the craft for inconstancy and for perversity of temper, and the incumbency of the office often changes. Various nationalities have been tried: Chinamen, Mexicans, Americans, Irishmen, Germans, Frenchmen. The Chinamen bring the economy that they are accustomed to exercise in their own affairs into that of their masters; it seems a second nature to them, and they cannot help it. This is an admirable trait when not carried too far, as it is when they economize so as to half starve those dependent upon them. In his first months here Mr. Cushing had with him two of his Zuñi friends. The cook at that time was a Chinaman, and he held that men who were idle did not require so much food as those who worked, and he applied the idea very rigidly to these two Zuñis. One of them rarely condescended to labor, while the other often went to the excavations and did good service with pick or shovel, receiving pay accordingly. To the worker Mr. Chinaman allowed two cups of coffee — a beverage of which the Indians are very fond — but the other was sternly denied a second cup, and when one evening he contrived to help himself to a second while the cook's attention was momentarily diverted, it was instantly snatched from his hand. The cook was likewise chary of pie to the non-worker.

When I first came to the camp a Mexican was temporarily in charge of culinary affairs, during a hiatus occasioned by the resignation of a much-esteemed American *chef* in consequence of a spree, and the fare was something unspeakable in the way in which good material was converted into various materials of indigestibility. A gaunt and pale young man next appeared on the scene, speaking one of the vernaculars prevailing south of Mason & Dixon's line, fond of talking of "the fine old family" to which he belonged, and expressing a sense of the degradation of the estate to which he had fallen. If he had had more respect for his calling and talked less about his antecedents perhaps his claim to gentlemanly rank would not have had to be so volubly expressed in order to obtain recognition — for I have had the fortune to encounter genuine gentlemen in nearly every walk of life. Poore's specialty was cakes and puddings, imposing in aspect and formidable in quantity — of their quality perhaps it is sufficient to say that our failure to eat any of them did not seem to discourage him in the least, and the same prodigious piles — that is, the same in appearance, though unfortunately for the resources in eggs and sugar, fresh-made each day — were triumphantly borne before us to cap the climax of each meal though left undiminished at its end. Perhaps the Mexicans disposed of them at their table, which accounts for the aversion they manifested towards the cook before he finally vanished in the cloud of the customary "rear" that usually serves to mark changes of culinary administration in this part of the world. Edward the Alsatian next appeared on the scene, and he proved a treasure; he took a pride in his work and knew how to give nice little attractive touches to his dishes and impart an appetizing flavor to his preparations. He was cheery and diligent, and far into the evening he would sing the German folk-songs of his fatherland over his work; pleasant to hear, for their melody's sake, even though he did invariably maintain the pitch a semi-tone below the key. Shortly after he came to us we had a little *fiesta* in honor of the birthday of Don Carlos, and Edward elaborated a magnificent cake for the occasion; with icing ornamented in the height of the confectioner's art. But alas, when cut it was like lead within! When Edward came in shortly after he saw a piece lying on a plate, and the transitions from astonishment, through disgust, to humiliation and grief that passed over his face would have furnished profitable study for a comedian. "Cheezus G-h-r-i-s-t!" he muttered slowly, inspecting it critically and then tasting it. We sympathetically assured him that the cake was good, the icing was fine enough to assure that, any way; but he refused to be consoled; he knew what cake was and when he said it was bad, it was no use to tell him it was good — he had forgotten the yeast-powder. "I magine you a cake domorrow!" he declared, and the next noon he set his success before us in justified triumph. But the spoiling of that cake gave us enough entertainment to atone for the mishap. Edward's weak point was his coffee, which was strange, considering the part of the world from which he came: as a guest expressed it, he was "coffee-blind." It happened that neither Mr. Cushing nor the ladies were coffee-drinkers, and so the rest of us suffered in silence rather than reveal the flaw in the one who gave such thorough satisfaction to them, until we received the delightful visit from the afore-mentioned guest, to whom a good cup of coffee was the main dependence at breakfast, and he frankly declared that it was the most abominable stuff it was ever his fortune to taste; a declaration which was concurred in by the rest of the table with astonishingly hearty unanimity. Whereupon Mr. Cushing, who included a good knowledge of cooking among his many accomplishments, proceeded to give Edward a course of instruction in coffee-making, with some degree of success, for the time being.

Rafael Castro, the handsome, stalwart youth who takes care of the animals and attends to the many wants of the camp, is a favorite with us all, like his brother Ramon. He is faithful, diligent, and a natural gentleman. Watering and feeding the animals, hauling water and wood, driving into town after the mail, and doing the daily chores of the camp, time does not hang heavily on his hands. In the morning the animals are set loose, and they repair in a herd to the neighboring acequia for water, Rafael riding bare-back on Jack, one of the largest of the mules. The other mules lie down to indulge in a roll the first thing, kicking the dust up in clouds. Jack, a solemn-faced creature, deliberately follows their example, Rafael stepping from his back as he nears the ground, and patiently holding the halter until the exercise is finished. "Get up, Jack!" he finally

[1] Continued from page 18, No. 681.

exclaims out of his limited English vocabulary. But Jack has not yet got enough, and proceeds to take another roll, while Rafael smiles indulgently. Rafael's English is limited to his remarks to the animals, and I observe that the Mexicans hereabouts seem to think it the proper thing to use our mother-tongue in addressing horses and mules. Possibly they learn it from the American teamsters, or perhaps it is because the horses and mules are American-bred, and understand the phrases better! Does not the proverb say that Spanish is the language of heaven, Italian of love, French of social intercourse, while English was designed to be spoken to animals?

Mules are devoted admirers of horses, and Mr. Cushing's herd is ardently attached to Douglas; oftentimes the latter will set them a bad example when returning from water, and, feeling the need of exercise, go galloping in splendid style off to our neighbor's barley-field, whose greenness appeals appetizingly to his eyes. The others feel themselves privileged to follow, and there is a grand scampering and flourishing of heels, until, after great efforts on the part of Rafael, they are finally driven back to camp, each marching to his or her respective place at the crib with the sober decorum of beings who never knew what a frolic was. The mules are a fine-looking lot, and it is interesting to note their individual peculiarities, manifest when together in camp, or when driven or ridden, in sympathies and antipathies towards each other — the mutual friendship of one pair, the stolid indifference of another; the strong affection existing between Dr. ten Kate's horse Billy, *alias* Café, and the skittish and sturdy little mule Zeñi, who are near neighbors at the crib, and stand and caress each other by the hour; the nervousness and feminine eccentricities of handsome Mary; Bob's occasional outbursts of irritability; the incurable laziness of great Pete and Barney; the alert responsiveness of Club and Thistle; the sullenness of Joe, and the omniverous appetite of Jack, who has a fondness for bacon and for mutton stewed with Chili-peppers.

The skeletons exhumed at Los Muertos are so badly decayed that it proves next to impossible to preserve them, and so Mr. Cushing decides to establish a side-camp at Las Acequias, where the more gravelly soil affords better conditions for sound bones. True, no skeletons had yet been found there, for there had been no excavations on that site, and the two doctors, who are to have charge of the operations, express some doubt as to the result. "You shall find skeletons in abundance, and splendid ones at that," said Mr. Cushing, and the result proves the justification of his prediction.

The new camp is pitched in a pretty little hollow, amid a clump of old mesquite trees. The hollow is that of one of the ancient reservoirs, and the moisture retained there makes it a favorable place for the luxuriant growth of the mesquite trees, which always flourish particularly well in such a spot. Three tents are brought from the other camp, and gleam brightly amidst the trees: a small wall-tent for the Doctors, a larger one for the Mexican laborers, the main force being transferred to the new field here, and the Sibley has been brought for the storage of the collections. One of the Mexicans has assumed the duties of cook, and the kitchen is established between the first two tents in the open air, the apparatus consisting of a "tarantula," or great iron frame supported on legs, and placed over the fire for the support of the various kettles, frying-pans, etc., and a crib is built for the animals needed for service here. The name conferred on this ancient city, Las Acequias, comes from the great irrigating-canals that spread out, fan-like, among the ruins, and reach away to various parts of the plain to supply the other cities of the group. Their course may still be plainly traced here, and one of them runs close by the camp, connecting with the reservoir in which it is situated. It must have been an enormous labor to excavate them in those times, with nothing but crude stone implements and baskets for transportation of the earth. The present Tempe Canal follows the course of one of these old ditches very nearly for some distance from the river, and where another passed through a hard bed of natural cement. The Mormons of the neighboring settlement in constructing their canal adopted the old route, thus saving an expenditure of between $10,000 and $20,000.

In a short time the plain is dotted with the yellow heaps of earth thrown up by the excavations, and rich archæological treasures are found in the shape of skeletons, pottery, stone-implements, and other articles. The two Doctors are found grubbing in the pits, industriously at work over the skeletons, over whose anatomical characteristics their enthusiasm is aroused to a high pitch. They are intent on securing and saving every bone, and are regardless of personal discomfort, not only their clothes being covered with the dust, but their faces begrimed and their hair and beards thoroughly powdered, making them look like some strange burrowing animals. The result of their painstaking is one of the finest and most complete collections of ancient skeletons ever brought together, and the consequent discovery of certain anatomical characteristics that promise to be of high importance in the determination of racial distinctions.

Las Acequias, like the other ancient cities, consists of groups of large houses, corresponding to our city blocks of dwellings, each of which was inhabited by a single clan. These are numbered in the course of the excavations, and the numbers are recorded on the plats of the ruins subsequently made. The skeletons and other specimens found are labelled with the numbers of the ruins and rooms where they are found, and the circumstances attending them are also recorded, so that each object is accompanied by a concise statement of its history, which, in connection with the preliminary and daily reports made by Mr. Cushing, will prove invaluable in the study of the collection, giving it a scientific worth such as few other collections possess. The circumstances under which objects are found, particularly when observed by one competent to make deductions from those circumstances, are frequently of even more value than the objects themselves in their relation to the main purpose of such explorations — the understanding of the people of whom they are relics.

The drive between the two camps becomes a familiar experience. It is made by some one in a buckboard almost daily, Mr. Cushing keeping close watch of the progress of the excavations. In the early weeks of my stay the intervening region is still a wilderness, with a clearing only here and there, so we cut straight across country through the various patches of mesquite, sage-brush, and greasewood that make up the wilderness. It is more difficult to find the way over these broad valley-plains than one might think, in spite of the landmarks presented by the neighboring mountains, for the spot one seeks is difficult to find amidst the general flatness of the land and the uniform character of the surrounding objects, which, amidst the various rambling cart-ways, make even the road itself hard to follow until one has made the acquaintance of its details through familiarity.

The landscape undergoes a rapid transformation in the course of a few weeks. Here and there, the plain is dotted with the camps of laborers engaged in clearing it, consisting of Mexicans at work for some contractor who has undertaken the job for the owner. Our nights are enlivened by the brilliant brush-fires gleaming around us in all directions, near and far. The mesquite trees are cut down and burned in piles above their roots, whose ramifications are followed by the smouldering combustion, leaving the ground ready for the plow when that instrument shall eventually be brought into requisition, which will probably not be for two, or even three years, for the mellow, rich soil needs no plow at first. A seed-drill rapidly sows the grain when the ground has been cleared, and the only labor then required is to irrigate and harvest; the next year, even the labor of sowing is unnecessary, for a luxuriant volunteer crop springs up from the self-sown, ripened grain, and often, the second year, there is still another volunteer crop as abundant as the first!

The growth of sage-brush or greasewood is cleared off with slight trouble or cost; a stout bar or beam is dragged across the land by a pair of horses, one attached to each end. The bushes are displaced by the powerful leverage at their bases as the beam is dragged over them. The team then follows the same course in the reverse direction and completes the destruction, either yanking up the bushes by the roots, or breaking off the brittle wood close to the ground. The brush is finally gathered into great piles and burned, making a strong, clear flame that flows across country for a great distance.

It is not long before the whole country is cleared, changing the aspect of the locality entirely. The land stretches away almost as smooth as a floor for miles, the very uniformity in contrast with the rugged mountain-chains around giving it a certain attractiveness akin to beauty. The tents of the settlers follow those of the clearing parties. It is an easy matter to become domiciled in this region, with its mild climate, unlike the settling of the rigorous Northwest: no shelter is required for stock, and little for the people, who live at ease in light tents, with their domestic belongings scattered about them in the dry air, until their first simple cottage of adobe or boards is ready. Not unfrequently one sees a handsome new buggy standing with evident ostentation before the tent of a new-comer, bounding up prominently from a distance.

The greater part of the land is taken up under the Desert-land Act, which, in order to encourage the reclamation of the desert, enables a citizen, or a man intending to become a citizen, to take up a whole section of 640 acres, a square-mile, in the arid regions of the country, on condition that it be cleared, irrigated, and cultivated within three years from the time of entry, on the payment, at the end of that time, of either $1.25 or $2.50 an acre, according as the land is within the limits of a railway land-grant or not, the latter, or "double-minim" price, being charged in that event; so that, for $800 or $1,600, one can obtain a square-mile of land, and, as only one-fifth of the amount has to be paid at the start on making the entry, the land will, of course, pay for this, and also the expenses of clearing, beside a handsome profit, if it be brought under cultivation at once.

Much of the land is also obtained by settlers under the Homestead, Preëmption or Timber-culture Acts, each of which permits the taking-up of a quarter-section, or 160 acres. It is possible for one man to take advantage of all these acts, and so obtain from the Government 1,120 acres of some of the richest and most valuable agricultural land in the world. Many of these settlers, who came into this valley a few years ago with nothing but their blankets, have already handsome fortunes.

Before I leave the valley, in mid-April, the greater part of this land, which I first saw as a primitive wilderness, is green with young grain. It will not be long before it all presents the same aspect as the beautiful homestead-region of Mesa City, the Mormon town close by Las Acequias. Driving towards the latter camp from Los Muertos, we see Mesa City simply as a long line of trees in the distance, with a few houses of recent settlers scattered here and there in the open on the higher side. It seems but a single line of trees bordering some irrigating canal, but, when we have once penetrated it, we find that it is the border of a beautifully embowered

town, with neat houses and long, shady avenues enclosing many a square-mile of vineyard and orchard. The little gurgling streams that run rapidly everywhere by the roadside beneath the rows of tall cottonwoods, which, with all their great trunks and spreading boughs, are but a few years old, are the secret of this prosperity. The gravelly soil of this spot was despised by the less intelligent Gentiles of the valley as comparatively worthless, but the more experienced Mormons at once saw that, for fruit-culture, it could hardly be surpassed. Mesa City, like scores of other Mormon towns that have sprung up in this part of the world, affords a practical example of what can be done by intelligent and systematic cooperation in a community, great economies being effected by the union of all the proprietors of the land in introducing a water-supply for irrigation, and economically administering it, so as to make it in the distribution utilized to the utmost; also by a well-devised arrangement of the land under common agreement, that enables great economies in the construction of boundary-fences, and also in its cultivation or use as pasturage; by carrying on other works in common, and thus effecting a great saving in labor; and again by establishing cooperative stores, where all members of the community can purchase the best of supplies in great variety at substantially cost-price, making, of course, a great saving in the expense of living. The Mormons accomplish all this by their superior methods of organization acquired in their years of isolation from the rest of the world; the necessities of their situation, as well as their devotion to a common cause, teaching them the advantages of working in cooperation, both for the individual and the community. For this reason the Mormons are, as a rule, far more prosperous than their Gentile neighbors.

Sylvester Baxter.

OFFICE-BUILDINGS. — THE CORCORAN BUILDING. — THE KELLOGG BUILDING. — THE ATLANTIC. — THE PACIFIC. — THE BALTIMORE SUN'S BUILDING.

THREE years ago there was nothing, as the term is understood in other cities, that could be classed as an office-building in Washington City. To-day we have several that claim attention, at least, for their magnitude, convenient arrangement and cost, as well as one or two for their artistic effect. The Corcoran Building, on Fifteenth Street, built some twelve years ago, was the first attempt at the construction of a large building devoted principally to office purposes. This building was designed by Mr. James Renwick, of New York, and cost in the neighborhood of $300,000. The ground-floor is taken up entirely by stores fronting on Pennsylvania Avenue, Fifteenth and F Streets. To reach the first office-floor, it was formerly necessary to climb a flight of steps, between eighteen and twenty feet high, and the elevator started in this second story. Recently, a great improvement has been made in this respect from plans by Cluss & Shultz, architects, by sacrificing a part of one of the stores, narrowing the original stairway and changing the space thus gained into a hall leading to the elevator, which has been extended to the ground-floor. The building is rectangular, the interior rooms and water-closets being lighted by a large light-well covered with glass. These rooms are poorly lighted and poorly ventilated. The exterior is built of red and buff brick, and the design is a modern Renaissance. The effect produced by the composition is not at all pleasing, as it has the appearance of a huge box pierced by numerous small and distinct openings, each treated with pilasters, cornice and pediments in buff. The main cornice of the building, as well as the cornices and pediments over the windows, are built of boldly projecting brickwork. The effects of the weather and time show that brick is not the proper material for such heavy projections, as the brick have been falling from the cornice so often that it has been found necessary to take down the boldest members of the cornice and substitute galvanized-iron in its stead.

The Kellogg Building, on F Street, designed by R. L. Fleming, was the first building devoted entirely to office purposes. It is conveniently planned, with well-lighted rooms and the ordinary office arrangements. The design is nondescript, stiff, poorly proportioned and inartistic; in fact, such a design as one would expect from a designer who was brought up as a carpenter.

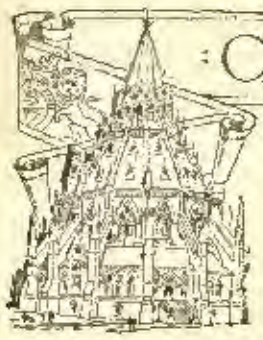
The Pacific finished about two years ago and The Atlantic completed last fall, both of which are situated on F Street, are alike excellent in their arrangement, size and grouping of the rooms, elevators, stairways, water-closets and other small conveniences, as letter-boxes and speaking-tubes for each room. From an artistic standpoint they differ materially. The Pacific is commonplace to the last degree. This is made the more striking because of the evident effort after architectural effect, made by the introduction of pilasters, segmental arches and mauldled brick, all put together in a monotonous manner and with poor proportions, which produces disagreeable effect on one of even limited artistic taste. The front of The Atlantic is a good architectural composition, if the ground-floor is omitted when it is taken into consideration. This floor is supported by small iron columns — small in comparison with the large stone piers which are above them in the second story. The second and third stories are built of Seneca brownstone, which is decidedly reddish in tone. The windows are grouped in three large semicircular openings which are deeply recessed. The windows of the third, fourth and fifth stories are grouped under three arches, with brick piers and arches, and terra-cotta caps and panels, with stone lintels and bond-stones. The seventh story is a row of small semicircular openings flanked by small terra-cotta columns and caps. The line between the seventh and eighth stories is distinctly marked by a wide foliated terra-cotta moulding. The eighth story is a series of rectangular windows, the whole being finished with a simple parapet-wall and terra-cotta coping. This building can be praised for its good points, but it is something of a pity that its construction should not be fireproof, and that the modelling of the stone-carving and the terra-cotta ornamentation should lack boldness and decision. They are so flatly treated that they lose their distinctive character across the street, and the street is not wide.

The *Sun* Building, erected by the Baltimore *Sun* on F Street, is decidedly the most costly and pretentious office-building in the city. It has been completed in the last year. While the Atlantic Building was designed by Mr. J. G. Hill, ex-Supervising Architect of the United States, the *Sun* Building was designed by Mr. A. B. Mullet, also ex-Supervising Architect, and Mr. Hill's predecessor. The designer in the case of the *Sun* Building has not been nearly so successful in the treatment of his problem as was the designer of the Atlantic. The front of the former is in white marble. With the exception of the first two stories, the windows of which are grouped into two large and one small round-arched opening, which are designed in a free Renaissance style, the design of this building has nothing to recommend it to favorable consideration. From the second to the eighth story the space is occupied by two long or elongated oriel windows springing from lion-head corbels, which cut through and destroy the apparent integrity of the arches of the second story. All the fifty windows above the second story to the roof are made on the same pattern (and it is an insignificant and weak pattern), making the whole painfully monotonous. The eighth story, with its sham French roof and a central tower, seems to have no reason for existence, unless it is intended by their ungainly stiffness to act as a foil for the five monotonous stories below.

Decidedly in this building's favor is the fact that it is well and substantially built, and its construction fireproof. The plan is of the dumb-bell form, with the stairways, elevators, and water-closets placed in the narrow central portion on two light-wells. It cost about five hundred thousand dollars, so I understand — a large amount in Washington for a building about 115 by 150 feet. There is a history connected with the selection of a design for this building, which is of interest to the profession as a warning against going into competition without clear instructions, or with merely verbal instructions: Several architects were informed that they could submit sketches, and that from the sketches submitted one would be selected, and that the rejected ones would not be paid for. The four or five architects mentioned availed themselves of the tempting bait, which was to be the most costly business structure in the city. The competitors, after waiting patiently, or rather, impatiently for a month or more, discovered, much to their chagrin, that the contract for making the plans had been awarded to an architect who did not submit a sketch in the competition. Two competitors wrote for their plans repeatedly (the others were returned, I think, in a short time after they were submitted), but did not receive them for some months. One set, in particular, was written for repeatedly, and several excuses were received in reply, giving as reasons why they were not returned that one of the *Sun*'s agents would be over in a day or two, and would bring them with him. On the first two or three trips the agent forgot them, but would bring them the next time. Finally, they were returned by this same forgetful agent. It is a little strange that it did not occur to the Baltimore *Sun*'s business men that two cents would have returned the sketches by the United States mail. As the building proceeded in construction, the architect of the retained sketches was very much surprised at the remarkable similarity between the design of the first two stories and the general plan of the building with the sketches he submitted. Whether this was simply a coincidence, only the proprietors or their agents can tell.

All the office-buildings mentioned run up above the adjoining property fifty feet or more, and many of the rooms in the four or five upper stories depend for at least a part of their light upon windows in the side walls. This, of course, will prove unfortunate in case the adjoining property-holders at some time carry up their buildings to the height of the office-buildings, in which case the light in many of the rooms will be limited to a serious extent.

It would not do to complete the subject of office-buildings without mentioning the small lawyers'-office building erected recently from the plans of W. M. Poindexter & Co. This building is on a corner, constructed in simple brickwork, and is unobtrusive, but effective, in its design. Being on a corner and narrow, the rooms are well lighted. It has an elevator and other office conveniences.



CANADA

SCHOOL OF ARCHITECTURE, TORONTO. — GREEN CHRISTMAS. — MONTREAL ICE-CASTLE. — NEW ROMAN CATHOLIC CHURCH. — SUCCESSFUL SPECULATION. — TORONTO ARCHITECTURAL GUILD. — ENGINEERING MATTERS.

THE leading architects of the city of Toronto, with whom the formation of an Architectural Association is a matter of great interest, were agreeably surprised early last month by a circular from the Minister of Education for the Provincial Government, addressed to them, requesting them to meet him for the discussion of a scheme he had in hand of establishing in connection with the School of Practical Science "full courses of instruction in applied chemistry, applied mechanics, and architecture." The invitation was extended to a number of manufacturers, skilled mechanics, and others having interests of a similar character, and on the 18th of the month, when the meeting took place, one hundred and fifty to two hundred representative men met the minister, and a very interesting and lively meeting was held. The minister directed the attention of the meeting: 1, to the consideration of the various kinds of skilled labor now required to carry on the industries of the country, and the best means of rendering it more productive, and, therefore, more valuable; 2, to the consideration of what courses of instruction would be necessary to provide such skilled labor at home as is now supplied from abroad; and 3, to inquire what industries (if any) not yet established in Ontario could be made productive, provided we could supply them with skilled labor. The minister called upon the engineers and engine-builders, and then upon those interested in the manufacture of woollen goods and of dye-works in connection with this industry, and there was not one who did not agree that the establishment of such a school as he proposed would be of immense benefit to the trades represented, and, therefore, to the country generally. The architects were then called upon to express their opinions. It will be remembered that a deputation of architects waited upon the minister some time ago with reference to the establishment of a chair of architecture, so that he knew this school would meet with their approval if founded on a proper basis, but his knowledge of this was confirmed and strengthened by the answers given to his questions. It was shown that no means existed in Canada for the testing of the strength and properties of the various building materials. Architects specify iron girders and columns — cements and mortars, to be composed according to given quantities: they go upon their own practical experience with regard to iron-work, and upon private experiments with cement and mortar, but this at best is unsatisfactory, and by no means equal to the satisfaction of having materials tested on the spot by proficients. The minister was also told that the architects would undoubtedly make their pupils attend classes for instruction in the art and science of architecture, were such a school to be established. A scheme will be presented at the next session to the Legislative Assembly, and it is sincerely to be hoped that no time will be lost before this contemplated school will be developed and in working order.

It is many years since we have had a "green" Christmas in Canada. But two days before Christmas the last vestige of snow in the streets of Toronto vanished, and Christmas Day opened mild and inclined to be showery, while in Montreal the rain fell heavily the whole day. The new year has opened without any change. The daily prognostications are "fair and mild," and with the thermometer rising to 40°, and sometimes above, with the lengthening days and the fairly clear atmosphere, it is hard to realize that this is January, and not April. Quebec and Montreal keep a little colder, as a rule, than Toronto, and there is more snow, but the temperature of the Northwest is very high above the average. Consequently, building operations proceed almost without interruption and without much risk. Many people who intend to build next year would have been glad to have got their houses started a couple of months ago, but, unfortunately for them, there was no weather-prophet to tell them we should have no winter, so far. Consequently they took the advice of their architects, and put off work till the spring. The sudden changes of temperature to which the climate is subject at this season render it impossible to say what a day may bring forth: it is necessary to cover up the day's work every night, for no one can tell that the thermometer will not be below zero the next morning.

The good people of Montreal have had an anxious time; the question has been daily: Will the cold be severe enough for the necessities of the winter carnival. These carnivals were an annual week of festivities, but it was decided that they were held too often, and if held once in two years they might be conducted on a more attractive scale and would prove a greater novelty, and, therefore, attract more visitors. The ice palace is, of course, the central feature, and, with the exception of last year when no carnival was held, it has been constructed of huge blocks of ice, averaging two or two-and-one-half feet thick, cut in the river, brought up to the site, hoisted by derricks and being slightly shaped with a hatchet, set in position, where usually they soon freeze together. This year, however, the ice is only about one foot thick, entailing more labor. Messrs. Hutchinson & Steele, architects, have hitherto designed the castle or palace, which usually occupies a considerable area, and rises to a general height of forty to fifty feet, with towers in addition. For the palace of the former carnival a few architects were asked to compete, but the request was not generally responded to. But the necessary restrictions on the account of the peculiarity of the material to be employed, did not allow of very great variety in design, consequently the same firm of architects who had undertaken the work on previous occasions carried it out.

In addition to the already numerous churches of the Roman Catholics of Montreal, another one is talked of. It is to be built in the suburb of Point St. Charles, and $100,000 is the proposed expenditure. Point St. Charles is a poor neighborhood, but this fact seems to have little or no relation to the construction of Roman Catholic churches. Already the parish church of Notre Dame, capable of seating 8,000 persons, and the great Church of St. Peter's, which requires in the neighborhood of $300,000 to complete, are a considerable burden to be borne by the faithful, not to mention the smaller churches, almost without number, supported by separate congregations, or by the revenues from the properties held by the various orders of nuns. At Longueille, a village on the shore opposite Montreal, but a little to the east, with a very poor population, a great church has just been completed; the people who were ragged and but half-fed supplied the funds, and, it is to be inferred, that the poor residents of Point St. Charles will be made to pillage themselves for the same object and, of course, for the benefit of their souls.

The rulers of the St. James Street Methodist Church undertook a great speculation. Their church was too small for them, and was out-of-the-way for the congregation. The site is a very valuable one, almost in the centre of the city, and was adjoined by shops and offices crowding closely against it. They decided to build a larger church in a more convenient situation, and sell the old place. A purchaser could not be found; then they determined to pull it down and erect a six-story block of offices (to which allusion was made in a former letter). This building is not completed, but an offer has been made by an insurance company to purchase it for the sum of $400,000.

The Architectural Guild of Toronto holds its first annual meeting early in January, and it is probable that the reports of the various committees to be presented at this meeting will give a fair idea of the useful work done by the Guild in the first year of its existence. The report of the Committee on the Matter of Professional Charges is one of interest to all. Architects in Canada are fully alive to the necessity of some change for the better in the usual tariff. Of course, the one and two per centers, who cannot rightly be called architects and, therefore, can never become members of a professional body or corporation, will still go on with their scheming, sneaking and underhand methods — the Guild has nothing to do with them. The intention is to get its members to agree to a regular system; its membership consisting of all the principal architects of the place, and, therefore, being the only representative professional body in Canada.

The deepening of the ship-channel of the River St. Lawrence between Montreal and Quebec to a uniform depth of 27½ feet has been completed, and the history of the successive deepenings illustrates the progress of oceanic transport business during the last twenty-odd years. Previous to the date of Confederation, July 1, 1867, the ship-channel had been improved at various dates, until at that time there was a channel 300 feet wide by 20 feet deep. The increasing trade necessitated deepening this, and a Bill was brought before the Dominion Parliament and passed in May, 1873, by which permission to contract a loan of $1,300,000 for this purpose was granted. Two feet was the extra depth decided on; operations were commenced in 1874, and by the end of 1878 the work was completed, at a cost of $1,153,512. The rapid increase in the size of vessels engaged in the Atlantic trade immediately required a deeper channel, and as soon as the last works were completed it was decided to deepen again, another three feet. Four years afterwards, 1882, saw the completion of the channel 25 feet deep and 300 feet wide. The quantities of material dredged out by deepening from 20 feet to 25 feet were: shale-rock, 289,500 cubic yards; earth of all sorts, including boulders raised by dredges, 8,200,000 cubic yards; boulders lifted by lifting-barges, 16,700 cubic yards. The channel through Lake St. Peter was the longest piece of dredging in one length, 17¼ miles, with a width varying from 300 feet to 450 feet, involving the removal of 8,000,000 cubic yards. The total cost of this five feet of deepening was, I believe, $2,780,130. In 1886 another loan was applied for and immediately granted, for $900,000, this time, to deepen another two and one-half feet of the whole area of the channel, and it is this work which was successfully completed in the beginning of October last, and which was opened by the Montreal Harbor Commissioners by a trip in the Allan Line steamship "*Sarmatian*" with a large number of guests.

After a great deal of time spent in discussion of the *pros* and *cons*, which, for such a scheme, were matters of great importance, it has finally been decided to construct a ship-railway from the Bay of Fundy to Baie Verte, and the cost is set down as in the neighborhood of five million dollars. If carried out, as it is proposed, with

expedition, this ship-railway in Canada will probably be the first in use in the world.

Toronto has in hand a piece of engineering that will by its result add considerably to its trade facilities, and the first sections of the work are nearly completed. The River Don is a small river to the east of Toronto, running in a southerly direction into the bay, so small and narrow that it was of no use commercially, although the supply of water was abundant. A scheme for straightening and widening and deepening this river was determined upon, the shores were to be reduced to a uniform level, and waste marshy land subject to annual inundations was to be reclaimed, and thus a new district with water facilities for transport purposes was to be prepared for warehouse and factories. Mounds or banks, in some parts 70 feet high, have been cut through and entirely removed, and the place now represents a desolate waste, flat as a pancake, with a wide canal in the centre. The new line of the Canadian Pacific Railway will enter Toronto along one of the new banks. It is estimated that the land reclaimed and levelled, with the advantages of the canal, will be as valuable as any land in the city, the price being $200 per foot front. The total reclaimed area is about 60 acres, valued at $6,000 an acre.

Ottawa has in hand a scheme for the construction of a bridge to connect the two shores of the Ottawa River at a distance of about two miles from the city, east from Rockcliffe, near the residence of the Governor-General, to Gatineau Point. The cost is estimated at $250,000, but the corporation expect the Provincial and Dominion Parliaments will contribute towards the expenses.

The little suspension-bridge spanning the river just below the Chaudière Falls at Ottawa is to be replaced by a new bridge, to cost $80,000. This little bridge is well known to most visitors to the city, as from it a fine view of the Parliament Hill is obtained in one direction, and the Chaudière Falls in the other. The volume of water over these falls is considerable, and they are well worth a visit. "The Devil's Cauldron," on the south side of the river, is one of those pits into which the water rushes at a terrific rate, seethes and boils, but never comes out again. Under the bridge are the chutes for the lumber rafts, by which they are taken from the higher to the lower level of the river. In the season distinguished visitors to the city are usually treated to a voyage on a raft, a rather exciting and slightly dangerous species of summer tobogganing. The new bridge will be 236 feet long by 45 feet wide.

Contracts for the construction of the Sault St. Marie Canal on Canadian land are let, and the work is to be proceeded with immediately, as the weather permits.

SOCIETIES

ST. LOUIS ARCHITECTURAL LEAGUE.

WHERE has been formed in St. Louis an organization for advancement and improvement in architecture and kindred arts. This organization is known as the St. Louis Architectural League, with officers as follows: Louis C. Bulkley, President; J. P. Annan, Vice-President; H. L. Eames, Secretary; J. L. Wees, Treasurer; L. H. Seubert, Corresponding Secretary and Librarian.

This organization is formed somewhat after the plans of the Chicago Architectural Sketch-Club. Suitable rooms having been procured and furnished in a respectable manner. Regular meetings are held every two weeks. The rooms are open all day from 10 A. M. until 10 P. M. Special evenings are given to sketching and lectures. There are twelve monthly competitions, one semi-annual and one annual competition. The subject of the first monthly competition is a mantle for the League Rooms.

L. H. Seubert, *Corresponding Secretary.*

COMMUNICATIONS

HOSE-PORTS IN PARTY-WALLS.

New York, Dec. 29, 1888.

To the Editors of the American Architect:—

Dear Sirs,—I saw in a recent issue of your paper, an article on Iron Shutters and Solid Roofs, in which, it is recommended that one shutter be left so as it can be easily opened from the outside. Now while that would be of some advantage it would be very small, and does not solve the problem of preventing large fires. The objective point at a fire is, of course, the material burning in the building, as the building itself, without the material, would not make much of a fire, and when a position can be reached from which a stream of water can be brought to bear upon the goods on fire, it can be easily extinguished. The penetration and effect of streams from the street can be seen by a line representing the front of the building "marked for window openings," and a line for the street, it will be seen that above a certain height the stream has no penetration and consequently no good effect but rather acts the other way as it has a tendency to create a draught. The proper way to fight a fire is from the inside which is done when possible; but at times it is impossible to reach the material burning from the inside, and the fire-department is driven to the street which necessitates street streams. It is at this point that owners and occupants of buildings should provide means to assist the department. My experience of the long and tedious job of cutting through party-walls at fires has suggested to me the advisability of having a permanent orifice in the party-wall that could be utilized by the department and would respectfully ask your opinion on the same. Yours, L. F. Stevens.

Primitive Well-drilling.—Addie Hue thus describes the system of deep-earth boring practised in the district in which he has for some time resided. A wooden tube six feet in length is first driven down through the surface soil. The tube is held at the surface of the ground by a large flagstone, having a hole in the centre to allow the tube to pass through and to project a little above it. A cylindrical mass of iron, weighing about four hundred pounds, hollow and pointed at its lower end, and having lateral notches or apertures, is jerked up and down in this tube at the end of a lever, from which it is suspended by a rope. This kind of "monkey" disintegrates the rock, the debris of which, converted into sludge by water poured in, finds it way through the lateral apertures into the interior of the cylinder. By raising the latter at intervals, this sludge is removed from the bore hole. The rate of boring in rock of ordinary hardness is one foot in twelve hours. Only one man is employed at one time to work the lever. By this means wells of 1800 feet deep are sunk in about two years by the labor of three men, relieving one another every six hours.—*Boston Transcript.*

TRADE SURVEYS

The ability which American ship-builders and manufacturers of ship-building material are showing in the construction of vessels is conspiring as much as anything else to aid the Government's efforts to supply itself with a navy. The Delaware ship-builders have made wonderful progress during the past three years in workmanship, and some fine vessels are now being turned out in the Delaware yards. Several war-ships under construction will be of the most advanced type. The speed of those that have been tried is up to the expectations and specifications of armored vessels the Government has named. Five have been recently launched, including a dynamite cruiser, which has developed a higher rate of speed than specifications required. It is a model of neatness and of marine engineering, and excels like devices of all other Governments. There are at present six vessels building. One is a first-class torpedo boat. The tonnage of those under construction ranges from 4,324 to 1,700 tons. The required speed is 19 knots an hour. The speed of the cruisers in commission is from 19 to 23 knots, and the tonnage from 2,000 to 5,300 tons. The new navy, when completed, will be equipped in all with 371 guns, from 5 to 8 inch bore, besides 3 13-inch dynamite guns of all armored vessels. Two are building which will carry six guns; four, 10-inch, and two, 12-inch. Five are completed as far as the hull, which will carry four 10-inch guns each. Public sentiment is to be credited with the creation of a proper war-like spirit upon the part of the Government. The work of constructing a navy will be pushed under the incoming administration, and during four years it is probable that the United States Government will be able to protect itself against any probable attack that differences in any event might bring about. Within the past thirty days information has been received from interior points concerning the probable activity on boat and river-craft building for the lakes and rivers. A great deal of tonnage is now projected, and by the 1st of April, it is said, on good authority, that the lake boat-yards will be crowded with work for the rest of the season.

Several large interior iron works have already received inquiries and specifications for material, and the manufacturers of marine boilers and engines and of engines of all kinds for river and lake service are living in daily expectation of large orders for supplies of this character. The manufacturers of structural iron have reduced prices $1.20 cents per ton in order to bring in increased trade. Quite recent advices confirm statements heretofore made relative to the undertaking of a large amount of bridge building in the Northwest and along the Pacific Coast. From present indications the adjustment of railroad troubles will be brought about without any serious legislative interference upon the part of Congress. The railway managers recognize that interference of that kind in the present complicated relations of railroad managers would be most disastrous. They recognize further that there is a strong public sentiment in favor of establishing further restrictions upon railway managers and of drawing the line still more closely about them. It is this knowledge that has made a feeling of harmony among railway managers possible. If Congress is compelled to act it may not without proper attention and knowledge as to how to arrange legislation that can reach the points that our intricate railway conditions are developing. Whatever combination is made each individual system will retain its individual identity and control over its own interests but it will surrender to the authorized authority the power of making rates. A great many evils still exist in the way of hauling freights in the thousands of industries. A great deal more is charged per mile for the short haul than for a long one. Commissioners know all these things and are slow to drive the managers into obedience to the law. Their willingness to obey the law is accepted in lieu of obedience at present. Perhaps this is the most that can be expected while they are passing through the transitional period. All these comments and discussions point ultimately in the direction of some sort of Government control. Neither public sentiment nor public interest demands that such an ultimate result be reached but the influences which are at work are driving the railroad interests in that direction.

Trade and industrial reports from all the industrial and commercial interests of the country make a very good showing as to volume of business. They show that production is under control, that competition is not likely to reassert itself to any damaging extent, that prices are likely to be uniform throughout the year coming in and that the evils which have brought about depressions and panics in years past will not be permitted to assert themselves to any great extent.

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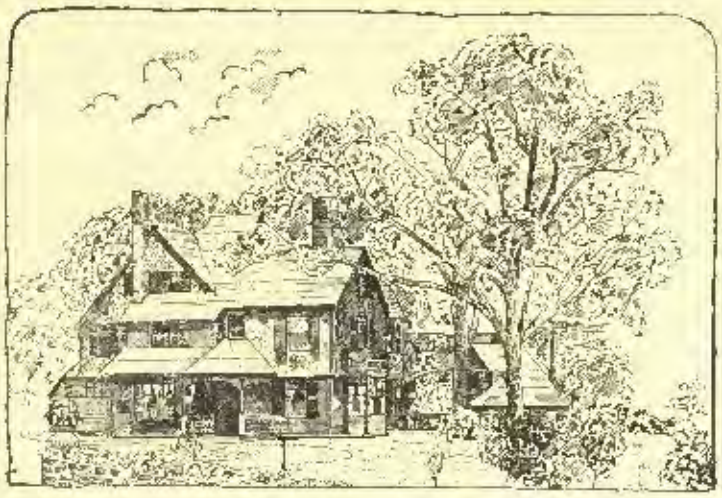

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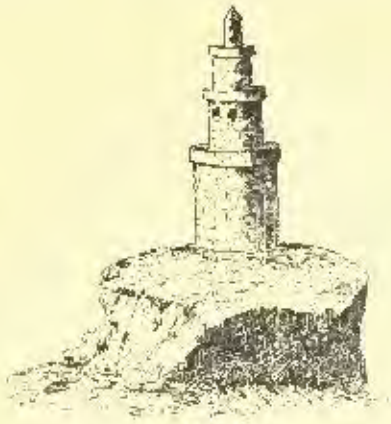
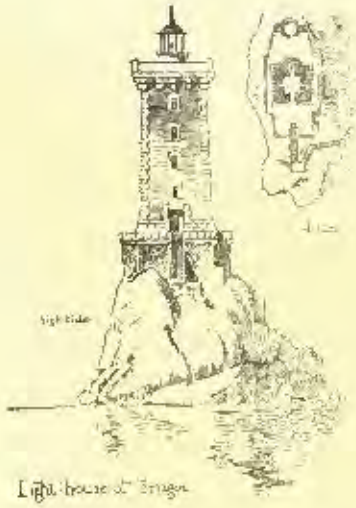


Lisbon Light-House.



Light-house at Smyrna.

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LIGHT-HOUSES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JANUARY 26, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE investigation of the office of the supervising architect of the Treasury Department, if it has not revealed such depths of sin and woe as the New York *Tribune* anticipated, has brought out some matters of interest to the profession. In regard to the accusation that he had made his examination-papers for draughtsmen so difficult that none of the candidates who presented themselves for appointment under the Civil Service rules could answer them, Colonel Freret said that many of the draughtsmen at present in the office could answer them, and gave a long list of those who were able to do so. He mentioned, also, that the only person to whom he had given any appointment since he took charge of his office was one messenger, so the idea that he concocted questions adapted to turning the candidate's hair gray, with the object of keeping out Republican assistants and getting in Democrats, appears to be unfounded. One of the investigating committee drew from this evidence the singular inference that the Civil Service rules could not be applied to architects and draughtsmen. A more sensible conclusion, we think, and one much more in accordance with the general opinion in the profession, would be that a position in the Government architect's office presents very little attraction to the better class of young architects, and that the men who can answer such questions as Colonel Freret's, of whom there are plenty to be found in private offices, would rather struggle for many years against poverty and neglect, with hope and ambition to console them, than to bury themselves for the best part of their lives in what the *Tribune* calls the "fat berths" of the Treasury Department.

A STILL more singular charge, to which Mr. Freret was called to answer, was that of having neglected, when he wished to employ outside assistance in preparing plans for public buildings, to advertise for proposals for such assistance, as the law requires in the case of mechanics' work. As the same law requires that the contract shall be made with the lowest bidder, a comparison of the proposals for furnishing plans would be only less curious than an inspection of the plans which would be furnished at the lowest price; but Mr. Freret explained that the work needed for his purpose was personal service, and that, by Secretary Fairchild's direction, it had been regarded as being outside the intention of the law relating to contracts with mechanics. Senator Morrill raised a question of some significance by asking whether it would not be better to have all the business of the supervising architect's office done by unofficial persons, to which Colonel Freret replied that the principal architectural associations of the country had urged this, but that he was not in favor of it, except so far as might be necessary to expedite the Government business. Notwithstanding this answer, we are inclined to suspect that Senator Morrill has his own opinion on the subject, and the investigation, which is, fortunately, in the hands of some of the best men in the Senate, will undoubtedly help to open the legislative eyes to some points in the Government practice of architecture which it has never before been able to perceive.

THE *British Architect* has something to say in regard to the Consolidation scheme now under consideration by the professional societies in this country, which is worth noting. In commenting upon the discussion which took place on the subject at the Convention of the Western Association, it takes up Mr. Sullivan's remark, that the new Institute "should be broad and democratic;" that it "should not set up factitious barriers," but should welcome all the thoughtful, earnest, ambitious men in the profession, and so on. It is not very surprising that Mr. Sullivan should have been understood to advocate the admission of all "thoughtful, earnest, and ambitious men," without inquiring as to whether they possessed, in addition to these qualifications, the important one of a knowledge of their business; and the *British Architect* fears that the American Institute may suffer, as the English societies have, by the admission of men concerning whom no one wished to say anything unfavorable, but whose presence in the Institute will repel the better trained architects, who will see no honor, but rather the reverse, in membership in a society which already contains those whom they know to be far inferior to themselves in attainment. That a similar consideration kept for many years some of the best English architects from joining the British Institute is tolerably certain, and it is with a view to making membership more honorable, as well as more difficult, that the system of compulsory examination has been adopted, and seems to be working successfully. In this country, we are inclined to think that a similar system of examinations will soon follow the adoption of the new constitution, and the revival of the efficiency of the Institute. There is no question that the State professional associations are strongly in favor of requiring proof, from an applicant for admission to their ranks, that he possesses the necessary qualifications. In many States petitions have been drawn up by the professional societies, and presented to the Legislatures, praying that persons who cannot pass a strict technical examination may be forbidden to practice architecture within the State; and the Boston Society of Architects, one of the largest and most independent in the country, some years ago adopted a rule requiring all new candidates to pass an examination. There is no need of being in a hurry to impose such a standard everywhere. As we all know, the technical training now accessible to American students of architecture was unknown when the older members of the profession began their career, and there are scores of men highly honored in the profession, and with reason, who never heard of the Acadians, or their influence on Greek architecture, and who would be hard put to it to explain the use of the pendants in fan vaulting. To force these men through an examination suited to the graduate of a professional school would be ridiculous, yet their admission, on evidence of honorable and successful practice alone, places us under no obligation to admit without examination the youth who has neglected all the opportunities which his senior would have so eagerly seized. If we keep in mind the maxim that examinations should be devoted to finding out, not what a man knows, but how he has utilized his opportunities, we shall not go far wrong. At present, the standard in the remoter States must be different from that in New England and New York, but if each State Chapter will devote itself to attracting and sifting out the best material in its own locality, by such means as it finds most efficient, all the members of the general body will have reason to be proud of belonging to it.

SOME one might make an interesting book, for architects, by describing the successive scandals, alarms, revolutions, quarrels, disappointments and fatalities which have attended the construction of the Albany State-House. The last grief that has afflicted the unfortunate proprietors appears to relate to the new ceiling of the Assembly Chamber, which replaces the famous stone vault. It seems from the New York

papers that the specification required that after the ironwork was in position "the whole ceiling" should be "covered with first quality kiln-dried quartered white oak, wrought out and finished in accordance with the several designs, in first-rate cabinet fashion, of the several shapes, sizes and thicknesses called for by the plans, sections and details;" all carved work to be done "in an artistic and spirited manner by first-rate carvers, who understand the motive and intent of the design." This specification, as our readers will acknowledge, conveys the idea that the ceiling was intended to be covered with oak, and the contract price, two hundred and seventy thousand dollars, would seem to be large enough to provide for using that material; so it is not surprising that certain members of the Assembly, on being told that the work actually consisted mainly of plaster-of-Paris, expressed a dissatisfaction which culminated in the appointment of a commission of three experts, to investigate the matter. We imagine that the office of expert to the Albany Capitol has become rather a thankless one, for two of the gentlemen appointed immediately declined to serve, and the third, being confined to his house with serious illness, could not serve if he would, so the Assemblymen most interested organized themselves into an informal investigating-committee, and had a stage built, from which they could examine the ceiling closely. It then appeared that there were some oak casings, or veneers, over the iron and wooden beams, but that the "artistic and spirited" carved work, together with the panelling, consisted entirely of plaster-of-Paris, spread on a backing of jute canvas, and painted to imitate oak. On seeking an explanation of this singular interpretation of the contract, it was pointed out to the Assemblymen that another clause in the specification provided that the panels were "to be of quartered oak, as shown, properly glued up and finished, or, if papier-maché is used instead of oak, the panels are to be formed high toward the centre." Nowhere else does there seem to be any mention of papier-maché in the specification, and the sentence has a curious air of interpolation.

WHETHER interpolated or not, the clause seems to have met with the approbation of the superintendent of the work, who very frankly explained that he had decided that curved panels would look better than flat ones, and as it would be very expensive to make them in oak with the dome-like form which he preferred, he had directed papier-maché to be used, and that this compound of burlaps, asbestos and plaster-of-Paris was the sort of papier-maché that he approved. In his opinion the panels were much better made of this material than of oak, as the oak would crack with the heat of the room, while the "papier-maché" would remain perfect for an indefinite period. We should say for ourselves that we would rather have an oak ceiling, cracked in every direction, than one adorned with "spirited and artistic carving" cast in plaster, but this view of the subject does not seem to have suggested itself either to the superintendent or the Assemblymen, whose principal anxiety, aside from a suspicion that they have paid for something a good deal more expensive than what they have got, seems to arise from the notion that the plaster papier-maché is likely to be disintegrated by the heat and dryness of the air at the top of the room, and to fall on their heads.

ACCORDING to the report of the Royal Commission appointed to investigate the causes of the conflagration which nearly destroyed the Palace of the Quirinal in Rome, last November, the fire service in the Imperial City seems to leave something to be desired. As might be supposed, the palace, crowded as it is with precious objects, is, in theory at least, protected by the most complete modern appliances for extinguishing fire. There are, or were, several pumps and engines in the building, besides a system of stand-pipes and hydrants, and telegraph-alarm lines communicating with the metropolitan stations; and a corps of firemen is always on duty. The fire was first observed about nine o'clock in the evening, bursting through the windows of the rooms on the ground-floor. The alarm was at once given, and the palace detachment of firemen appeared promptly on the scene. The next thing was to find the key of the room in which the engines and extinguishers were locked up. This did not take long, but as the room turned out to be one of those which was blazing most fiercely, it was useless to attempt reaching anything in it. The next resource was to telegraph a signal to the metropolitan stations, but, as the wires or batteries were out of order, the signal could not be transmitted. There was a telephone from the palace to the city-stations, which, however, also proved to be out of order and unserviceable. In the meantime some of the firemen had been detailed to open the hydrants, and were looking for the keys, which had been mislaid. After the search had finally been given up, the commander, with praiseworthy energy, directed that the pipes should be broken, since they could be opened in no other way. They were accordingly smashed with axes and hammers, but proved to be quite dry inside, the water having been for some reason shut off at the mains. By this time a group of soldiers had arrived, who formed a line and passed buckets from a neighboring fountain, to be emptied on the flames. Meanwhile the city authorities were aroused, and two hand-engines soon made their appearance, which poured tiny streams into the blazing building. These were followed by men belonging to the steam fire-engine corps, who drove up in cabs or arrived on foot, ready for service when the engines themselves should come. There was a delay, however, of about an hour and a half in the appearance of the latter, owing to the fact that the Roman fire-department has no horses, but makes requisitions on the omnibus companies for motive power, and the omnibus companies, which receive no pay for the use of their animals, do not show remarkable alacrity in furnishing them. When the engines finally arrived, it was discovered that no one had thought to light a fire in them, and an hour more was spent in remedying this deficiency and getting up steam. Toward midnight, however, they began to work, and in three hours afterward the fire went out.

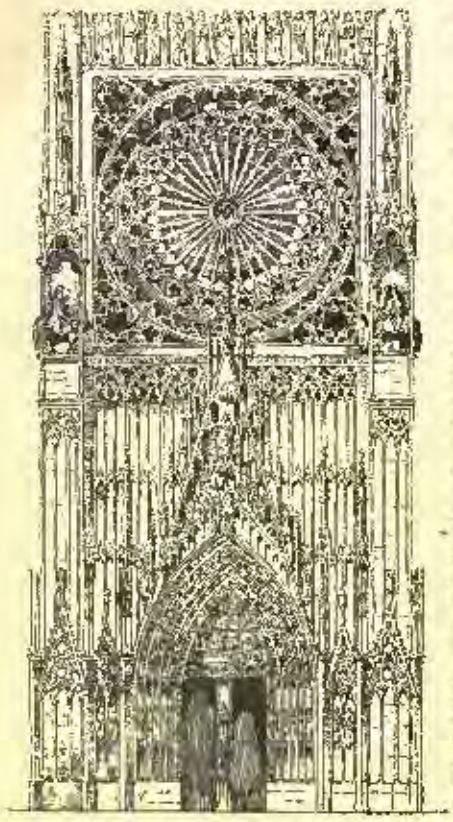
THE well-known establishment of Haines, Jones & Cadbury, of Philadelphia, now organized as a stock company, has for the past two years carried out a simple plan of sharing profits with its employés. The sum divided this year among the men is ninety-one hundred dollars. This is six and one-half per cent on the total wages of each workman who has been with the firm long enough to be entered on the list as a sharer in the profits, or about three weeks' extra pay for each man. There are few persons who would not find a bonus of three weeks' extra income at the end of December in each year extremely convenient, and we imagine that the Haines, Jones & Cadbury men reflected with considerable satisfaction, the night before New Year's, upon the occasions when they had made a special effort to make their work systematic and efficient, and resolved, for the ensuing year, to make these occasions more frequent, and to use their experience in promoting still more the harmonious operation of the factory which they help to conduct. For the next year, a dividend to the workmen is to be made if the profits exceed six per cent on the capital, and will be shared in by all who have worked for the company during the whole year.

MR. GEORGE HATHORNE, at one time a very prominent architect in New York, died in that city about two weeks ago. Mr. Hathorne was a native of Massachusetts, but had spent most of his life in New York. He was a man of quiet tastes, but an excellent architect, and devoted to his profession. He was one of the early members of the American Institute of Architects, and for many years took a prominent part in its proceedings. Much of his work was out of the city, Springfield possessing, perhaps, his most important buildings. He was unmarried, and leaves no very near relatives.

THE New York *Mail and Express* announces that the Trustees of Columbia College have decided to establish a Department of Electrical Engineering in connection with the School of Mines, and adds that "There is no such department, it appears, at any of the American universities. Columbia, therefore, will have the honor of taking the lead in the matter." While we wish the new school all possible success, and do not doubt that it will deserve it, the claim that it is the first of the kind in the United States needs modification, the Massachusetts Institute of Technology having for several years maintained a Department of Electrical Engineering, which is very popular, and has graduated some of the most noted young electricians in the country, while, if we are not mistaken, there are two or three other schools of the kind of high reputation.

EQUESTRIAN MONUMENTS.[1]—XII.

AS ADJUNCTS OF ARCHITECTURE.



Main Entrance, Strasbourg Cathedral.

THE fate that befell the bas-relief of Henry IV over the central portal of the Hôtel-de-Ville, at Paris, has already been noted, and whether the bas-relief of the same monarch on the Hôtel-de-Ville, at Lyons, shared a similar fate during the first Revolution, when the city was besieged by a Republican army under Kellerman, or during one of the numerous uprisings that followed cannot be ascertained; perhaps, as the city was doomed to destruction in revenge for maintaining a defence for two months, it is likely that the Hôtel-de-Ville suffered at that time, or if not then it may have fared ill when the strikers, thrown out of work by the commercial disorganization which followed the Revolution of 1830, seized the building in 1831 and, presumably, pillaged it. It is possible, too, that the bas-relief now extant on this building is the third of its kind that has been placed there, for the original may have been erected in the lifetime of Henry and so have been destroyed when the building was burned in 1702. At all events, the illustrations show that the building at some period of its existence was restored, and that the place of honor is still accorded to the bas-relief of Henry IV, by Legendre Hérald, a native sculptor.

Cousteu's bronze bas-relief of Louis XIV, which still ornaments the central *fronton* of the Invalides, was also subjected to a certain amount of injury at the hands of the Paris mob in 1793; but thanks to its inaccessible position or to an unexpected access of sentimentality on the part of the insurgents—who may have reasoned that the Invalides was a highly useful and valued charitable institution, and that Louis XIV, whatever his misdeeds, did one good act for posterity in founding it, and so deserved, in so far as this particular effigy was concerned, tender treatment at their hands—a persistent attempt was not made to dislodge it; so, though battered with stones and shot, it was suffered to remain till more peaceful times admitted of its rehabilitation, in 1816, by Cartellier. The inscription on the bas-relief reads: *Ludovicus Magnus militibus, regali munificentia in perpetuum providens, has ædes posuit 1670.*

Maréchal Lesdiguières, Château de Vizille, France.

Wanton destruction in almost every part of France was practised by the Republicans, and many a château which bore within or without treasures of Renaissance sculpture was destroyed. Amongst others that succumbed was the Château de Vizille (Isère), of which, however, there remains a doorway which once opened from the avenue into the garden, and still bears upon its *fronton* a bas-relief of Marshal Lesdiguières by Jacques Richier.

The Hôtel-de-Ville, at Compiègne, which was built between 1502–1510, in the reign of Louis XII, was decorated with statues of saints in niches, and in the place of honor, in a niche like that more familiar one at Blois, was an equestrian figure of Louis XII, either in the round or in high relief. This figure was replaced by a similar figure of Louis XIII at a later day, who, in turn, was probably less gently dismounted during the Revolution. This building was restored some fifteen years ago, and a bronze bas-relief of Louis XII, by Jacquemart, executed in 1869, now holds the place of honor.

The Hôtel-de-Ville, at Rheims now bears in a similar position an equestrian bas-relief of Louis XIII the work of the Sculptor Milhomme who in 1818 thus replaced an earlier bas-relief of the same kind which had been destroyed on August 13, 1793.

The famous house of Jacques Cœur, at Bourges, formerly bore an equestrian statue of Charles VII, and a more humble one of the lord of the manor himself, who was shown mounted on a mule, which, for some now unaccountable reason, was shod backwards, so that it would have puzzled an American redskin to know how the animal was travelling.

In the same category should be mentioned the figure of Oldrado (or Orlando di) da Tresseno, Podesta of the city, on the wall of the Palazzo della Ragione at Milan, a building erected by him between 1228 and 1233. This figure, in high relief, representing a personage famous, or infamous, as having first burned heretics at the stake, is shown "with bare head and hair cut close in the neck, after the modern fashion, riding on a heavy-limbed horse. The group though wanting in life has a certain homely truth to nature, and is interesting as being one of the first works of its kind made in Italy since the days of Justinian."[2]

But equestrian sculpture had other forms of application in architecture than as bas-reliefs in the *frontons* of public buildings. Surface-ornament, either in high or low relief, was, of course, the

From the Temple of Vishnu, Seringham, India.

form in which it was most commonly used from the times of the Egyptian and the Assyrian to the present. The use of the horse as a feature of decorative construction is comparatively rare, about the only instances being found in Southern India at Madura, Seringham and elsewhere, where the horses take the place of cantilevers to support the superincumbent structure.

The horse friezes of Classic times are too familiar to all to need description here, but there are to be found in many countries buildings in the decoration of which the horse has been introduced effectively, ingeniously or ridiculously, but almost always with a purpose which can sometimes be deciphered, but oftener cannot. One of the earliest of modern examples is to be found in the façade of San Michel, at Pavia, an early Lombard church, across the front of which at irregular intervals stretch narrow sculptured bands of grotesque figures, amongst which are easily discernible figures of horsemen, centaurs, Pegasi, and wild horses[3] mixed with other figures, the whole suggesting an attempt at picturing some of the fables of mythology which accident has singularly disjointed. The want of connection and arrangement, and the seeming lack of appropriateness of such sculptures as parts of an ecclesiastical structure, suggest that the building offers an early instance of the once

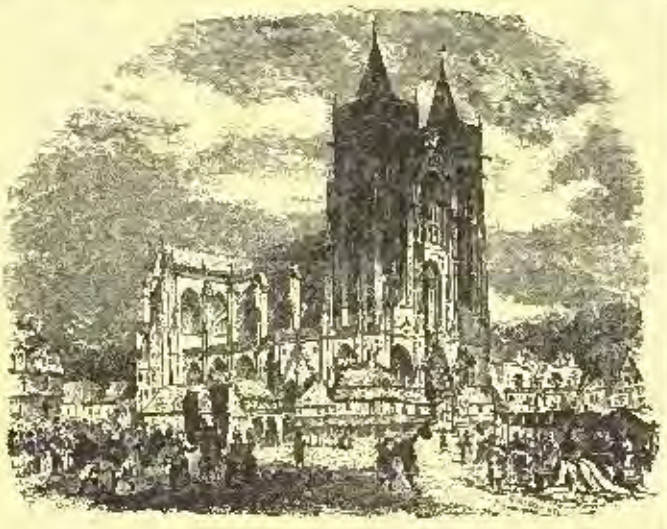
[1] Continued from No. 676, page 270.

[2] Perkins's "*Historical Handbook of Italian Sculpture.*"

[3] "Dragons, griffins, eagles, snakes, sphinxes, centaurs—the whole mythological menagerie which our ancestors brought with them from their native Iran—and these either fighting with each other or with Lombard warriors, or amicably interlaced with human figures, male and female, or grinning and ready to fly at you from the grey wall—interspersed with warriors breaking-in horses or following the hounds, minstrels and even tumblers, or, at least, figures standing on their heads; in short, the strong impress everywhere meets you of a wild and bold equestrian nation, glorying in war, delighting in horses and the chase, falconry, music and gymnastics—ever in motion, never sitting still—credulous, too, of old wives' stories, and tenacious of whatever of marvellous and strange had arrested their fancy during their long pilgrimage from the East—for zodiacs from Chaldea and emblems of the stirring mythology of Scandinavia constantly alternate, in these and similar productions, with the delineation of those pastimes and pursuits which their peculiar habits induced them to reiterate with such zest and frequency."—*From Lord Lindsay's "Christian Art."*

common fashion of rebuilding into a new building the artistic wreckage of some earlier pile. To be sure the figure of the archangel, trampling down a dragon over the central door, shows that some portion of the work was especially prepared for its present position —perhaps all may have been, for through the whole range of mediæval sculpture it is impossible to always satisfactorily explain the presence of the many figures and groups which, while undoubtedly grotesque from a modern point-of-view, it is wholly impossible to determine whether they are intentionally or unintentionally so.

The triumph of St. George over the dragon has been immortalized in stone in so many places by so many notable artists that it deserves consideration later as a special subject; but, besides St. George, there were many other heroes of saintly legend who performed their feats on horseback, and there are many churches where St. Martin, St. Hubert, St. Paul and others[1] are more or less intelligibly and artistically preserved in marble, stone or bronze. Besides these, there are legendary heroes and historical personages of doubtful authenticity, who are honored in the same way upon some edifice in what is supposed to be their natal town. To search these out, enumerate them and briefly recount the associated legends would be an interesting but somewhat laborious task, and it will, perhaps, be enough of an indication of the character of the field which might be explored, if there is here given the story of King Gradlon, whose



Cathedral at Quimper, Brittany.[2]

equestrian figure surmounts the gable of the façade of the Cathedral at Quimper, in Brittany, the most important and almost the most interesting ecclesiastical structure in that province. Brittany is peculiarly rich in legendary lore, and the French painters of our day are extremely fond of turning to it for the subjects of those great show-pictures that plaster the walls of each year's *Salon*. Some of these legends have an interest also for the descendants of the Anglo-Saxon, and amongst them is the tale of Gradlon, who was a brother of one of the early British Kings, and was a sample of the clean and simple-minded chivalry who have caused the fame of Arthur's knights to survive through centuries. King Gradlon's capital was the city of Is,[3] on the seacoast, or rather just off the coast, for it was actually built below the level of the sea, which was barred out by heavy dikes: like Mont St. Michael, it could only be approached in boats or by land when the tide was out. Unfortunately, Gradlon's daughter Dahut does not seem to have been present when the occurrence took place that converted him to Christianity, for one can imagine that Messalina, herself, would have listened to warnings coming from the lips of St. Corentin, after she had seen him feed the king and his train of huntsmen to their satisfaction, all from a single slice of a carp, which, after affording this feast, swam away uninjured. In spite of the entreaties of her father and the rebukes of the hermit saint, Dahut continued in her profligate courses, and entertained lovers unnumbered. At length weary of the constant importunities of the hermit, she, one night, stole from her father, who always wore it about his neck, the key which opened the gate in the sea-wall or dike, and giving it to her lover of the moment, persuaded him to open the gate just as the tide reached the walls. Roused from his sleep by the report of the pressing danger, Gradlon, with unselfish parental affection, sought his daughter, and then his horse, following the fleeing crowd with his daughter *en croupe* as

The Flight of King Gradlon. After a Painting by E. Luminais.

the frightened citizens splashed through the rising tide toward the shore. The horse struggled nobly, but being overweighted was losing ground every moment, when St. Gwenolé, who alone kept pace with the king, commanded him to cast Dahut into the rising tide, as it was because of her vicious life that this disaster had overwhelmed the city. The king, feeling that the saint voiced God's will obeyed, and saved himself.[4] The legend is a famous one and is celebrated in poetry as well as prose. Tom Taylor in his translation of the Ballads of Brittany thus renders a portion of the "Drowning of Ker-Is":—

> Awake, Sir King, the gates unspar!
> Rise up, and ride both fast and far!
> The sea flows over bolt and bar!
>
> Now curse'd forever mote she be,
> That all for wine and harlotry,
> The sluice unbarred that held the sea.
>
> "Say, woodman, that wonn'st in the forest green,
> The wild horse of Gradlon hast thou seen
> As he passed the valley-walls between?"
>
> "On Gradlon's horse I set not sight,
> But I heard him go by in the dark of the night
> Trip, trap—trip, trap,—like a fire-flaught white."

The annexed cut shows the model for the statue which is now in place on the Cathedral at Quimper, the work of the sculptor, A. Ménard, made necessary by the destruction of the original statue by the Revolutionists in 1793. Another cut[5] shows the church as it existed for many years, but it now bears a different aspect, for one of the many works of restoration and completion entrusted to Viollet-le-Duc was the completion of its western spires, in 1858, the funds being raised by subscriptions of two-sous pieces contributed by the frugal peasantry. The actual work of construction was carried out under M. Bigot, the architect of the Department.

King Gradlon, Quimper, Brittany. A. Ménard, Sculptor.

The mention of Viollet-le-Duc's name gives a reason for introducing here a reproduction from a pen-drawing made by him of

[1] The Horse as an Attribute in Sacred Art.—The horse is often associated in sculpture and painting with SS. George, Hubert, James the Greater, John, Bishop of Bergamo, Martin, Maurice, Norbert, Victor, Pope Leo, Papon de Marchiennes and Count Thibaut. Besides these, a horse or ass kneeling before the holy sacrament is an attribute of Saint Antony of Padua; a horse before an altar is associated with St. Bernard; a wild horse drags St. Orestes; a horse falling over a precipice leaving his rider unharmed indicates St. Hugo; a horse bearing a saint with a child mounted behind him marks Gregory of Armenia; a horse beside a saint beckons St. Irenæus; a horse or horses dragging martyrs along the ground illustrate the stories of St. Anastasius, St. Martinien and St. Saturnin; saints trampled upon by horses may be St. Geroldus, the soldier, Saint Norbert or St. Paul; while a herd of horses surrounding a saint marks St. Bertuline, the Confessor.—Cahnehault's "*Dictionnaire Iconographique des Figures, Légendes et Attributs des Saints*," 1850, Paris.

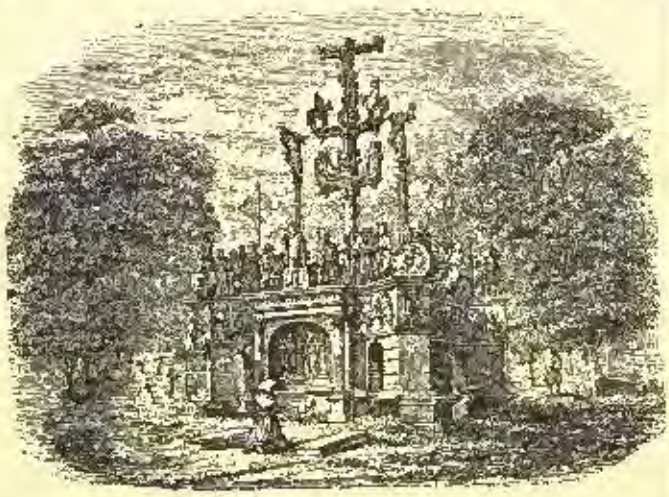
[2] Is.—"The anonymous chronicler of Ravenna mentions a town, which he calls Ker-is, as existing in Armorica in the fifth century. Here ruled a prince called Gradlon rawre, that is, Gradlon the Great. Gradlon was the precursor of Gwenolé, the founder of the first abbey established in Brittany."—From Longfellow's "*Poems of Places*." It is said that beneath the waters of the Bay of Douarnenez traces of a submerged city can still be seen.

[3] The Legend of King Gradlon.—Another story has it that Dahut, being reproved by Gradlon for her profligacy, imprisoned him and warned Corentin never to approach Is again. Corentin, however, disguised himself as a prince, won her love and obtaining the key to the sluice-gates (as above) freed the king and let loose the waters upon Is and Dahut. The trampling of Gradlon's horse, which carried him from the fated city, is still heard at night, and upon a rock called Garrec, near Le Kis, is shown the mark of his hoof. Every year on the first night of May, the peasants say that the city, with all its castles and towers, rises from the waters at the first stroke of midnight and sinks again at the twelfth. Such was the magnificence of Is, or Ker-is, as it is sometimes called, that Paris is said to have derived its name from being equal to Is,—Par-is. The country people say that they can hear sometimes the church-bells of the submerged city ringing with the motion of the current.

[4] From Jules Janin's "*La Bretagne*."

the Romanesque church at Surgeres, France, (twelfth century) upon the façade of which exist two fragments of equestrian sculpture, bas-reliefs in niches high up on the wall.

The Bretons, at once the most superstitious and the most religious portion of the French people, have two other curious monuments which have interest for us, one the famous Calvary at Plougastel, a



The Calvary at Plougastel, Brittany.[1]

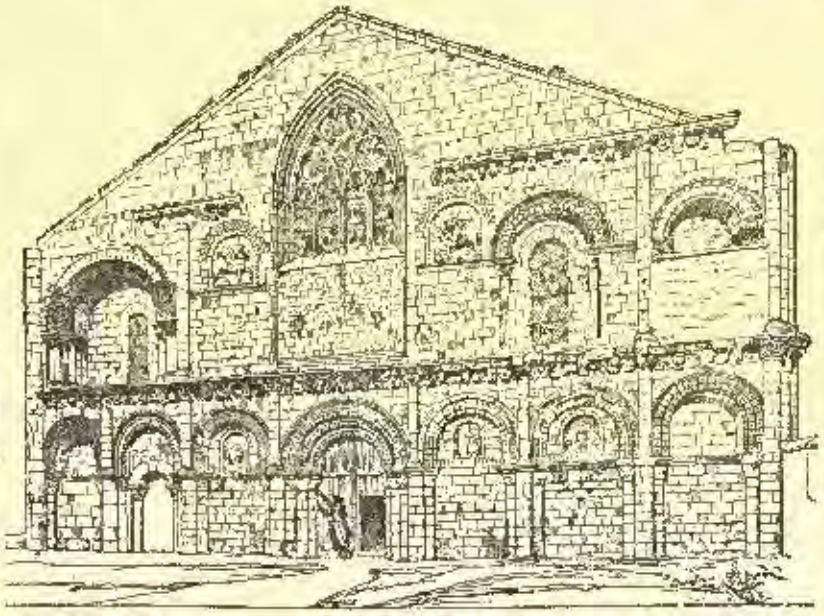
rich mass of crude sculpture, in the round and in the flat, which presents scenes from the New Testament which involve more than two hundred figures of large size. The equestrian element is here represented by the half life-size mounted figures of two centurions who balance one another at either end of the middle arm of the three-armed or pontifical cross which is the important feature of the composition. This calvary is a rallying point for the pilgrimages which are incessantly made to and fro over the face of Brittany. It was erected in 1602–4, at a time when the province was ravaged by a great plague, and was restored in 1867. The other object is also a calvary, at Pleyben, which is likewise large but somewhat less elaborate in treatment. The equestrian figures, here four in number, are at the corners of the pedestal on a level with the foot of the cross.

One of the most ordinary forms of sculptural decoration applied to architecture is the representation on the façade of a cathedral of a whole college of saints and holy fathers, or a complete series of the departed sovereigns of the kingdom. These are usually bestowed each in his own niche, and, as a rule, are pedestrian figures. The Cathedral of Strasbourg affords a variation from the conventional treatment, for here, just above and on either side of the main doorway, are equestrian figures of King Clovis and Rudolph of Hapsburg, while Dagobert holds a corresponding position in a tabernacle on the corner buttress and is kept in countenance at the other corner by the strangest of companions to be paired off with a mediæval king — none other than his magnificence Louis XIV, set there not as might be supposed during the lifetime of that monarch, a piece of the regulation self-glorification, but about 1823. The three others are coeval with the church structure. But the effect here is somewhat marred by the narrowness of the tabernacles in which they are placed, the heads and tails of the horses protruding on either side in a very awkward manner. A more agreeable, if somewhat bold

St. Martin and the Beggar-man, Lucca, Italy.

and seemingly unstable treatment is to be found on the front of the cathedral at Lucca, where, his horse's feet supported on corbels only, St. Martin, in the round, is shown in the act of dividing with his sword his meagre cloak that he may give half of it to the beggar-man who stands at his stirrup. This work is ascribed to Guidoctus of Lucca, an artist of the thirteenth century. Unused corbels on the opposite side of the arch seem to show that a similar figure once occupied or was intended to occupy a corresponding position.

Rudolph of Hapsburg, from the Front of Strasbourg Cathedral. Erwin von Steinbach, Sculptor.



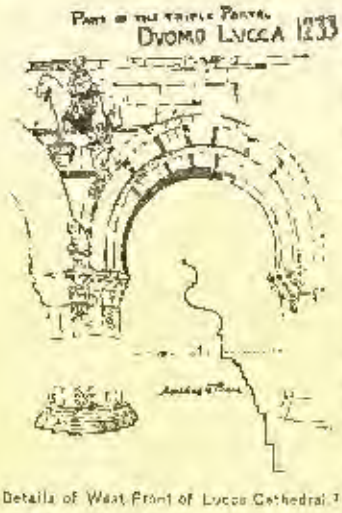
The Church at Surgeres, France. After a Pendrawing by Viollet-le-Duc.[2]

King Clovis, from the Front of Strasbourg Cathedral. Erwin von Steinbach, Sculptor.

King Gradlon is not the only one who has mounted to the topmost pinnacle of material exaltation: there are a few other instances where it has been found worth while to set an equestrian figure as high above ground as possible. The most recent instance of this is the monument to the Duke of Brunswick, at Geneva, which is closely patterned after the tombs of the Scaligers, at Verona, in this particular. But there are others of a slightly elder time which should be noted. Why the brewers of Brussels should hold in special honor Charles, Duke of Lorraine, can be explained by those familiar with the history of the Netherlands in the last century. Possibly

[1] From Jules Janin's "*La Bretagne.*"
[2] From "*Compositions et Dessins de Viollet-le-Duc.*"

be, during his rule as stadtholder, did the guild some real or trifling favor, confirmed a privilege, abated a tax or some such thing. Perhaps he was merely a jolly-good-fellow, and liked his cakes and ale, and so became a sort of patron saint of the craft. At any rate, whatever the cause, the Hôtel des Brasseurs, at Brussels, bears on its gable top an equestrian figure in gilt bronze of the Duke modelled by the sculptor Jacquet, about 1854. This is the fourth equestrian statue that has been placed here. The first was a statue in stone of the Elector Maximilian Emanuel of Bavaria, the work of the sculptor Marc Devos, erected in 1697, at a time when the building was known as L'Arbre d' Or. This statue was overthrown by a storm and was replaced by a reproduction in bronze with the inscription. DUX BA VARIÆ DRUXELLENSIUM SALUS. In 1752, this statue gave place to a bronze statue of Charles of Lorraine, by Simon, a goldsmith of the city. This statue was conceived in the Classic style and would pass for a reproduction of Bouchardon's Louis XIV. When the French invaded Belgium during the Revolution this statue was destroyed and half a century passed before the void was filled by the present statue. A model of the statue of the Elector of Bavaria exists in the National Museum at Munich.



Details of West Front of Lucca Cathedral.[1]

Still another misplaced horseman can be seen apparently riding over the roofs of the cathedral at Mayence.

JEAN LEGENDRE HERAL (OR HERALD).—Born at Montpellier,[2] 1795. Died 1851. Pupil of Chinard and Ressil. Principal works: Narcissus, Hebe, Eurydice, Leda, Psyche, St. Paul and a statue of "Giotto tracing a sheep's head in the sand," the latter being in the Louvre. He made a statue of Turgot for the Chamber of Peers and one of Laurent de Jussieux for Louis Philippe, and many portrait busts.

GUILLAUME COUSTOU.—Born at Lyons, 1677. Died 1746. Brother of Nicolas Coustou, another well-known sculptor. Studied in Paris under Coysevox, gained the grand prize and went to Rome. Some of his best works were made for the garden at Marly, including the "Horse Tamers" now at the entrance to the Champs Elysées. He also executed, among other works, a basso-relief of "Christ with the Doctors," at Versailles, and statues of Louis XIV and Cardinal Dubois. In the Louvre, the Salle des Coustou contains his statue of Marie Leczinska, and works by his brother and his son Guillaume, who was also a sculptor. The elder Guillaume also made a bronze figure of the Rhone for the pedestal of Desjardin's equestrian statue of Louis XIV at Lyons, which was destroyed during the Revolution.

FRANÇOIS DE BONNE.—Duc de Lesdiguières, Connetable de France. Born 1543. He fought on the Protestant side in the civil war which began about 1562 and obtained the chief command of the Protestant army in 1575. He was one of those who most effectually aided in placing Henri IV on the throne. In 1608 he was made Marshal and Duke and about 1610 commanded the army in Italy, where he defeated the Spaniards. He abjured Calvinism in 1622 and was made Constable of France. Henri IV once said he would acknowledge his own inferiority to no captain in Europe except Lesdiguières. Died 1626.

LOUIS XII (called "The Father of his People").—Born at Blois, 1462. Succeeded his cousin Charles VIII in 1498. Married Anne of Brittany. Conquered Milan and (in alliance with the Spaniards) Naples. He was, however, afterwards defeated by the Spaniards (with whom he had quarrelled), at the Garigliano, and later by the Holy League and finally forced to evacuate Italy. During his reign Brittany was reunited to France. He died in 1515.

HENRI ALFRED MARIE JACQUEMART.—Born at Paris, 1824. Pupil of F. Deharoche and Klagmann. Among his works are an equestrian statue of "The General-in-Chief of the army of Italy, 1796" (*Salon* of 1864); statues of "Michael Ney, December 7, 1815;" "Suleiman Pacha" and "Mahommed-Bey" (both for Cairo); a bronze group of "A Carmel-Reiver of Asia-Minor"—Souvenir of Upper Egypt, and many other admirable works portraying animals, in the modelling of which he is among the first of living sculptors. He made the two Griffins for the Fontaine Saint Michel, at Paris.

FRANÇOIS DOMINIQUE ARNE MILHOMME.—Born at Valenciennes, 1782. Died at Paris, 1823. Pupil of Lebrun. He made many busts and statues, among the latter being Hoche, Colbert, and Louis XIV, and executed a number of commissions for work on and within public buildings.

CHARLES VII ("The Victorious").—Son of Charles VI. Born 1403. Became king in 1422. With the help of the Maid of Orleans he reconquered France from the English. Died 1461.

JACQUES COEUR.—A French merchant and able financier, born at Bourges about the end of the fourteenth century. He acquired an immense fortune and Charles VII made him director of his finances. In 1448 he lent that king 200,000 crowns of gold. It is stated that he transacted more business than all the other merchants of France. Falsely accused of various crimes, he was in 1453 fined 400,000 crowns and banished. He died in exile 1456. His magnificent hotel at Bourges is famous as one of the finest monuments of the Middle Ages.

MADURA HALL, built between 1623–45. "The façade of this hall, like that of almost all the great halls in the South of India, is adorned either with yalis—monsters of the lion type trampling on an elephant—or, even more generally by a group consisting of a warrior sitting on a rearing horse, whose feet are supported on the shields of foot soldiers, sometimes slaying men, sometimes tigers. These groups are found literally in hundreds in Southern India, and, as works exhibiting difficulties overcome by patient labor, they are unrivalled, so far as I know, by anything found elsewhere. As works of art, they are the most barbarous, it may be said the most vulgar, to be found in India, and do more to shake one's faith in the civilization of the people who produced them than anything they did in any other departments of art.—From Fergusson's "*History of Indian and Eastern Architecture.*"

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[1] From a paper in the *Architectural Association Notes.*

[2] Some authorities say at Lyons, or rather call him, "*une sculpteur Lyonnais.*" Jouanne's Guides and other authorities say that the Lyons Hôtel de Ville was erected in 1646–1665; burnt in 1674; restored in 1702 by Mansart; entirely restored by Desjardins about 1801. The statue is spoken of as having been put up since this last restoration.

ANDRÉ-RENÉ MÉNARD.—Born at Nantes, 1805. Pupil of Ramey. He made the monument of Rear-Admiral Théodore Le Hey at Pornic; statues of "Haidée," "Mercury lavesting the caduceus," "The Condemned," the monument to Billault at Nantes and one to Mgr. Graverand in the Cathedral of Quimper. His native city contains a number of works by him, many of which serve to decorate its public buildings.

RUDOLPH OF HAPSBURG.—Emperor of Germany and founder of the House of Austria; born 1218; died 1291; son of Count Albert IV of Hapsburg; sought to enlarge his patrimony by many wars—with the Swiss, Hungarians, Alsatians and other German peoples; chosen King of the Romans and Emperor in preference to Alfonso of Castille and Ottocar of Bohemia in 1273, an election brought about by the Archbishop of Mentz as a reward for Rudolph's escort on his journey across the Alps, then infested with bandits; his election led to wars with his defeated rivals; failing in his attempts to restore the imperial power in Italy he abandoned his claims upon that country and ceded to the pope a large territory saying: "Rome is like a lion's den in the fable; I discover the footsteps of those who went toward it, but none of those who return;" he put a stop to the building of castles by the nobles and in one year razed seventy to the ground.

CLOVIS.—Founder of the Frankish monarchy; born 466; died 511; was converted to Christianity by a miracle at a battle near Tolbiac, 496, where he was on the point of being overcome by the Alemanni when he thought of his Christian wife Clotilda and her God, and falling on his knees cried: "God of Clotilda, give me assistance in this hour of need and I confess thy name," and immediately the tide of battle turned in his favor, and true to his word Clovis was baptized within the year.

DAGOBERT.—King of the Franks; son of Clotaire II; born 600; died 638; his court rivalled in magnificence that of Constantinople; revised and published the Salic and Ripuarian laws. His is a curious figure to find upon a church for an old French chronicler says: "This Solomon of the Franks, given up to lewdness, entertained no less than three wives bearing the names of queens, and so many concubines that it would be too long to enumerate them." He was buried at St. Denis.

CHARLES OF LORRAINE.—An Austrian General, called Prince Charles of Lorraine, born at Lunéville in 1712, was the second son of Duke Leopold I and a brother of Francis I of Austria. He commanded the Austrians in the war between Maria Theresa and Frederick the Great, by whom he was defeated at Czaslau in 1742. In 1744 he forced Frederick to evacuate Bohemia. Married a sister of Maria Theresa, and was appointed Governor of the Low Countries. At the beginning of the Seven Years' War he was commander of the Austrians, and gained a victory over the Prussians at Breslau in 1757; but, having been completely defeated in the great battle of Leuthen, in the same year, he resigned his command. Died in 1780.

JEAN JOSEPH JACQUET.—Born at Antwerp, 1822. Pupil of G. Geefs. He has won many medals and is professor of sculpture at the Royal Academy in Brussels. Among his works are a group entitled "The Golden Age," and statues of "Love Disarmed" and "Aurora."

[To be continued.]

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE HOTEL DES BRASSEURS, BRUSSELS, BELGIUM—EAST END OF THE CATHEDRAL, MENTZ, GERMANY.

[Gelatine print, issued only with the Imperial Edition.]

See article on "Equestrian Monuments."

A STATION ON THE LINE OF THE BALTIMORE & OHIO RAILROAD.

MR. A. H. BIELER, ARCHITECT TO THE CORPORATION.

THE building contains two waiting and toilet rooms, ticket-office and baggage-room, on first floor. On the second floor there are telegraph-offices and sleeping-apartment for night operators. The building is built of mountain boulders up to sill line, above this of brick. The interior finish is of red-oak.

THE HOTEL DE VILLE, RHEIMS, FRANCE.

THE last number of the *Moniteur des Architectes* brings us this print just in time to include it amongst the illustrations of the article on "Equestrian Monuments."

THE OLD HOTEL DE VILLE, LYONS, FRANCE.

THIS plate is reproduced from the "*Tableaux Historiques de la Revolution Française*," in connection with the article on "Equestrian Monuments" elsewhere in this issue.

FACADE OF SAN MICHEL, PAVIA, ITALY.

THIS plate reproduced from Ramée's "*Le Moyen Age Monumentale et Archéologique*" in connection with the article on "Equestrian Monuments" elsewhere in this issue. The building is attributed to the Lombard kings but belongs to the late eleventh century.

THE HOTEL DE VILLE, COMPIEGNE, FRANCE.

THIS plate, showing the building as it now exists, is referred to in the article on "Equestrian Monuments."

THE HOTEL DE VILLE, LYONS, FRANCE.

TAKEN in connection with the print of the building as it existed before the post-Revolutionary restorations, this illustration referred to in the article on "Equestrian Monuments" elsewhere, affords an interesting study.

DESIGN FOR A COUNTRY HOUSE. MR. C. SCHAFER, ARCHITECT, CHICAGO, ILL.

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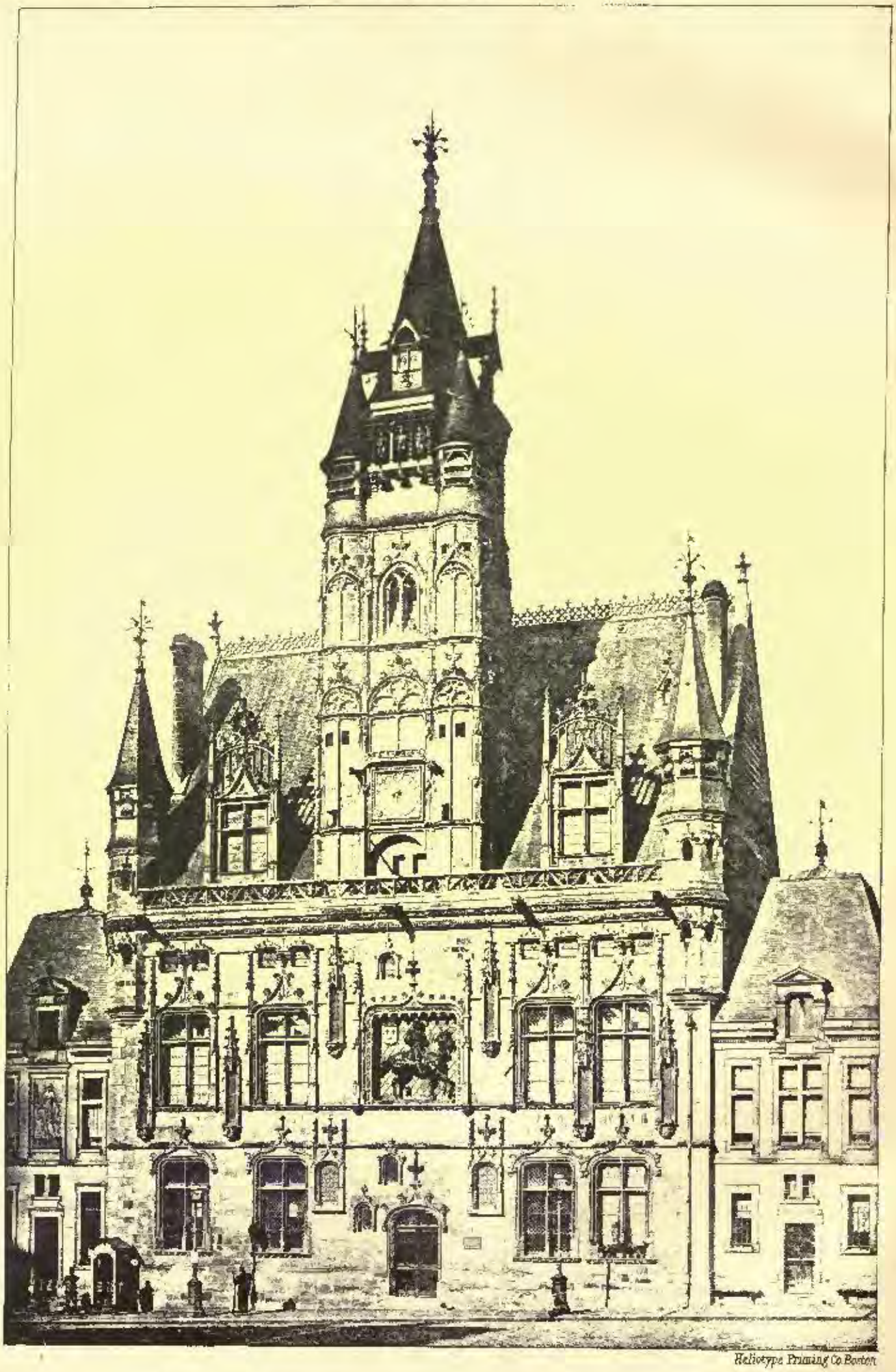

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HOTEL DE VILLE, COMPIÈGNE, FRANCE.

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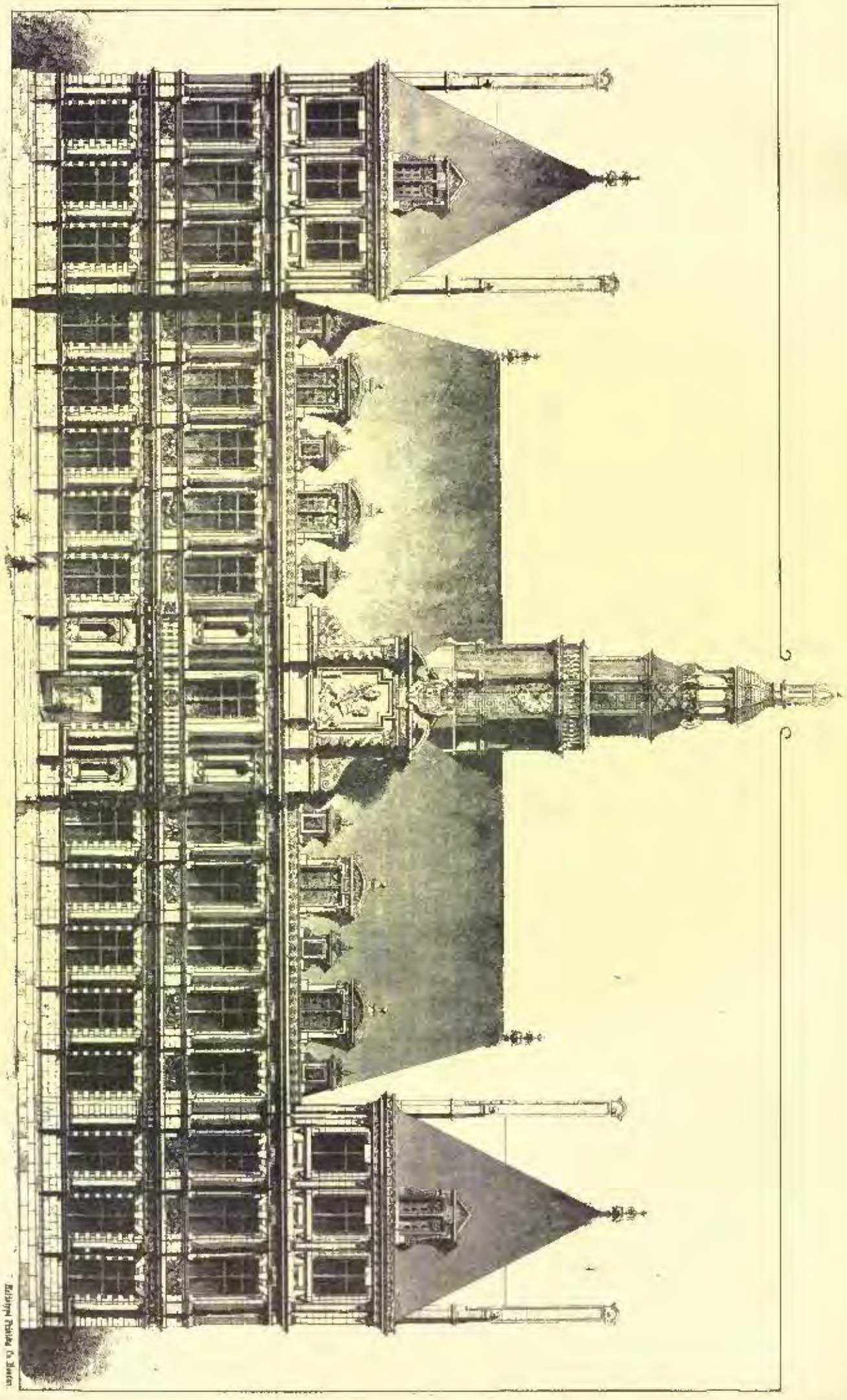

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FUSILLADES DE LYON, COMMANDÉES PAR COLLOT-D'HERBOIS.

le 14 Decembre 1793, ou 24 Frimaire An 2me de la République.

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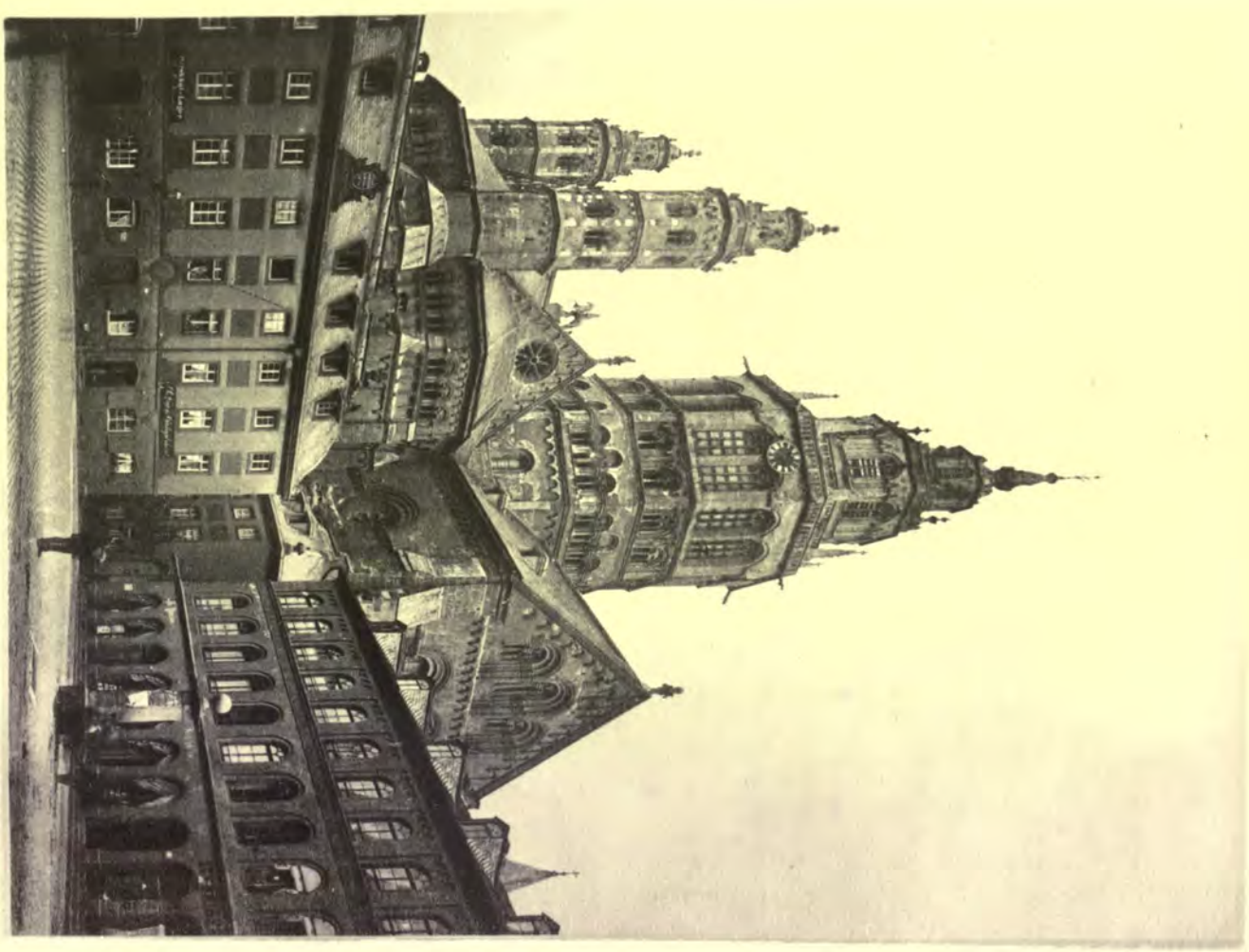
THE HOTEL DES BRASSEURS, BRUSSELS, BELGIUM.



THE CATHEDRAL, MENTZ, GERMANY.

HELIOTYPE PRINTING CO. BOSTON.

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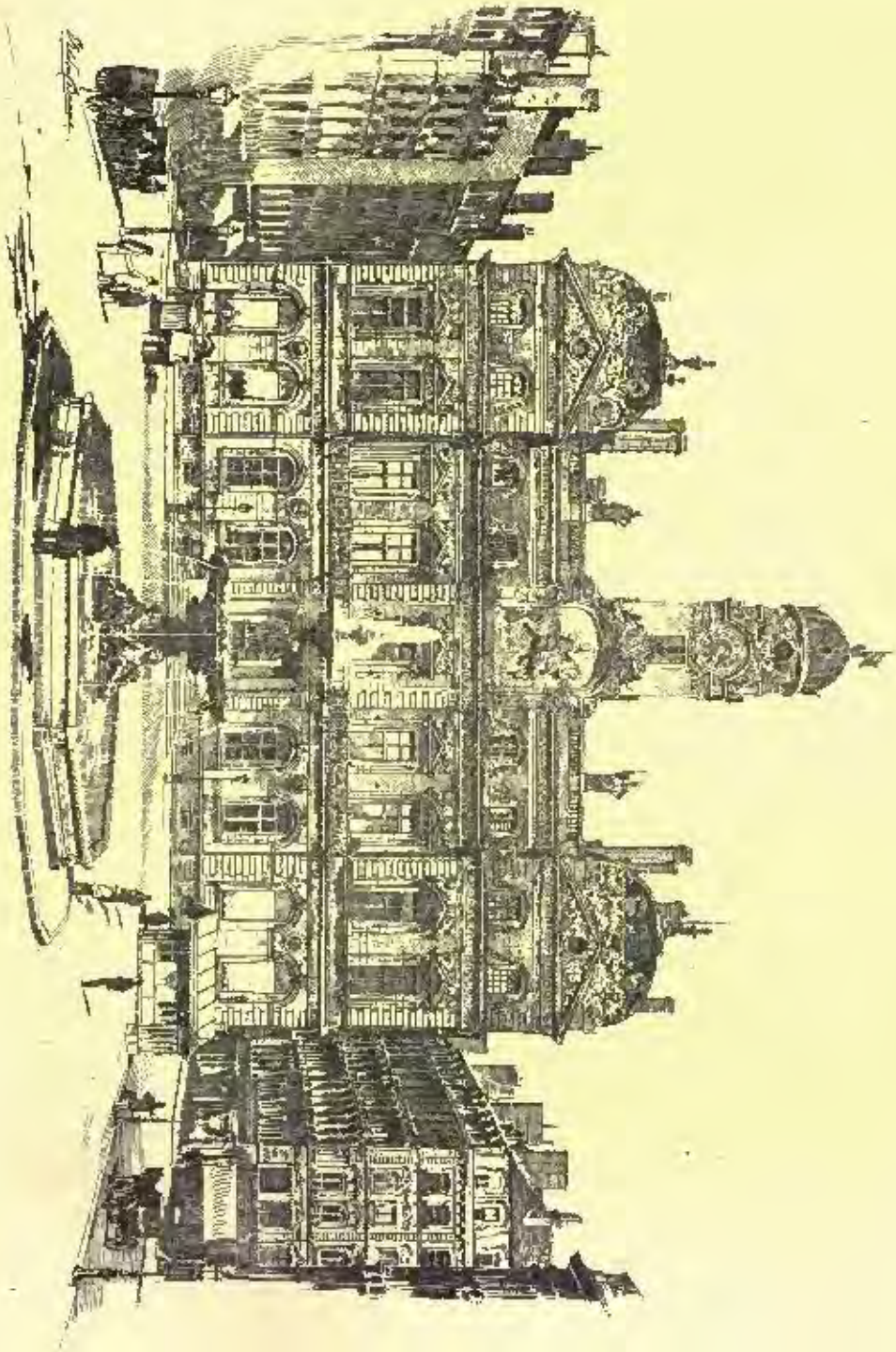

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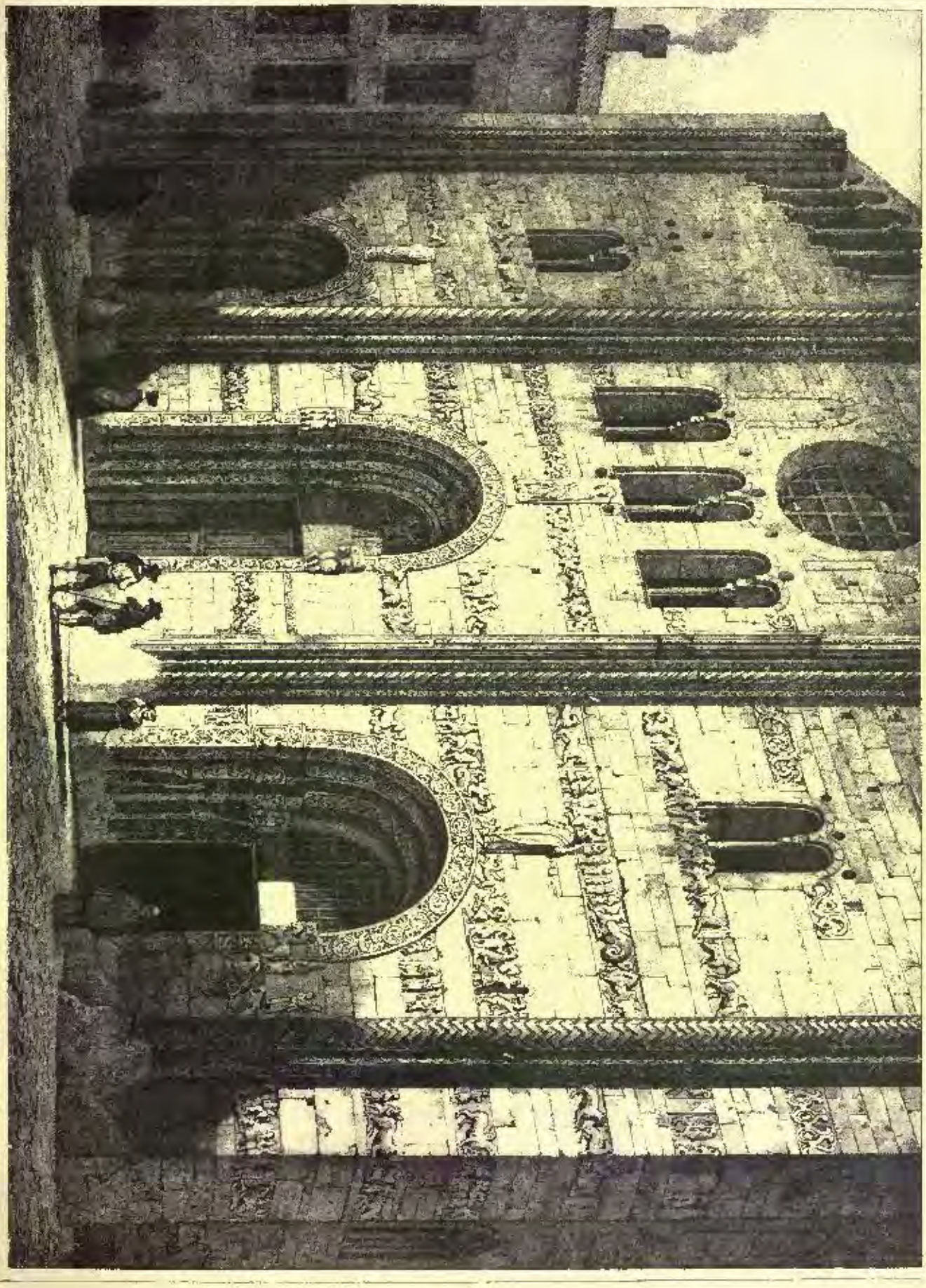
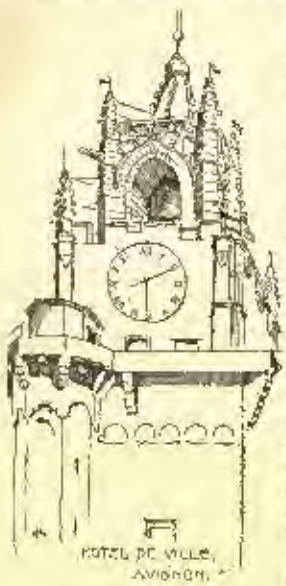


Heliotype Printing Co. Boston.

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1]—IV.



AS the work proceeds, the obscure hints and indications concerning the life of this ancient people become more clear and plain. A beautiful instance of how history, archæology, and the traditions retained by living peoples all contribute in their interrelation to reveal a picture of the past with graphic fidelity is afforded by a certain thread which Mr. Cushing followed out in its course hither and yon, until it led to the conclusion. Briefly it must be stated here. The narrations of the early Spaniards mention a certain pueblo, the "kingdom" of Cibola, or Zuñi, as containing a population of so many within and so many without the walls. Standing by itself, this statement has been accorded no particular significance by historical students. But here in these excavations Mr. Cushing came across frequent remains of a different class of dwelling than the urban houses, standing in clusters in the fields, or just outside the boundaries of the town. Then he recalled a folk-tale of the Zuñis, about a maiden who herded turkeys, and belonged to the low-class dwellers outside the town. The Zuñis to-day have certain persons who, for various shortcomings, are compelled to live across the river, outside the town, though not now numerous enough to form a distinct community. All these facts combined to bring out certain evidence with distinctness: that these peculiarly situated and constructed dwellings were the habitations of an ultra-mural, low-caste, agricultural and herder population, and that domesticated animals were kept by the town-dwelling Indians in pre-Columbian days. Among these domesticated animals were turkeys, and probably rabbits, and perhaps still another very important kind, as we shall see. Mr. Cushing has found, in his linguistic investigations of the Zuñi language, how the past of a people may be recorded in the structure of their idiom as plainly as fossil-remains tell the story of the geological past, or contain the record of the development of a chain of species in the gradual modifications of the evolutionary chain. The Zuñi tongue has a word for this outcast, ultra-mural population, which conveys the meaning of "self-thrust out," or, "cast out by their own acts"; that is, voluntary outcasts. Such a people, by some circumstance, some act of desecration perhaps not even intentional, place a ban upon themselves which forbids either them or their descendants to live in contact with those within the walls. A permanent outcast class is thus formed. This is quite in accord with primitive religious beliefs. It is notable that in Peru there was also an outcast agricultural population, and Peru contains many resemblances to this primitive North American culture. It is also notable that the Sudras, the low-caste population of India, are tillers of the ground.

In excavating the remains of one of these ultra-mural houses, a group of animal figurines was found buried together. They were crudely, but realistically made animals with long ears and without horns. The Zuñis have to-day the practice of making figures of sheep, horses, and other domestic animals, which they sacrifice for an increase of herd. As these ruins were unquestionably pre-Columbian, and as, of course, there were no sheep here in those times, the problem was: What were these effigies meant for? Their resemblance to the llama was so marked as to be noted at first sight by Doctors ten Kate and Wortman and other observers. This, taken in connection with other evidence, led Mr. Cushing to the belief that among the domesticated animals of these ancient people there was a species of the llama family. The other evidence was found in the numerous petrographic inscriptions abounding in the Southwest, in the traditions of the Zuñis, and in the narratives of the early explorers, which speak of a domesticated animal answering to this description among the Pueblos of that day. To be conclusive, however, it needs the finding of the bones of the species among the ancient remains — something that has not yet been done — and, while the testimony of the old Spanish explorers is strong, it is notable that they do not mention seeing the animals themselves, so that at that time they must already have become rare. Mr. Cushing has, however, accumulated an important mass of testimony weighty enough to justify laying it before the scientific world to await the time when the required links shall be found, encouraging others to look in the same direction.

It is well known that North America was the home of the anchinea, or llama family, the ancestor of the Old World camel, and the fossil-remains of numerous species, large and small, have been found by palæontologists, while no fossils have, I believe, yet been found in South America, the present home of the family, — limited to four species there. Two of these species are domesticated there, and have been since prehistoric times — the llama, the only beast of burden that existed among the aboriginal population of the New World; and the alpaca, which was bred for its wool. As these species are, therefore, comparatively new in South America, and as it has been something of a puzzle for naturalists to account for their being there; and as, moreover, North America was the home of the family, it is not unreasonable to suppose that some one or more of the species of anchinea were already domesticated among the ancient populations of this part of the world; that they were taken to South America by the gradual spread of the primitive cultures thither in very remote ages; that the other species differentiated there from the original stock in consequence of escape from domesticity; that meanwhile, in North America, the climatic changes wrought by the advance of the glacial period drove the various species of the family into new environments, where the conditions proved unfavorable, and brought about their extinction. Some may have remained in domesticity, and possibly lingered here and there till about the time of the Spanish conquest, when descriptions of them were heard by the invaders of Cibola. As serious epidemics are often known to break out among domestic animals, it is not unlikely that something of the sort may have swept the last of them from existence, which would account for the fact that none of them were seen by the Spaniards.

One day Mr. Cushing, Don Carlos, Ramon and I, with a Mexican laborer, proceed to explore the great cave in the face of Central Butte, near the town of Tempe. By its position Mr. Cushing determines it to have been the "northern place of sacrifice" for the neighboring ancient town of Los Hornos. The butte lifts its head boldly from the plain, forming a lofty cliff. In its precipitous face the dark opening of the cave shows like the deeply recessed entrance of a Gothic cathedral, the pointed arch something like forty feet or more from the base. The customary slope of detritus, worn away from the rock by the slow friction of the ages as they pass, lies at the foot of the butte. Ascending this, and standing at the mouth of the cavern, we survey the surrounding country. The prospect is enchanting. It is the height of spring-time, the 9th of March. Verdant fields rich with young grain spread for miles around, embroidered by long lines of trees in full leaf, and silvery threads of irrigating-water gleaming in the sun. Here and there a house may be seen almost concealed beneath a mound of leafage, and not far away stands the clustered town, accented by puffs of steam from the train just arrived.

Don Carlos leaves us and drives into the town, regretful that routine errands prevent him from sharing our explorations, and the rest of us turn to the lesser mysteries of the cave where in their devoutness the worshippers of perhaps many centuries ago have stored the symbols of their faith that shall help illuminate the understanding of the seekers after knowledge of what man is as they delve in the soil where his being is rooted — the nature of primitive man.

The cave is a great crevice between the two monstrous masses of rock which lean against each other, and form the mass of the butte. It narrows gradually and runs in for something like fifty feet or more, far enough to make the light very dim at the farther end. The floor slopes upward from the entrance at a heavy grade. The air is dry, and at a considerable distance outside the entrance may be perceived the odor peculiar to caverns in this country, coming from the droppings of the bats and the terrestrial rodents that inhabit it. The rat-like jumulos have brought in the joints of the cholla cactus in great abundance. As this cactus bristles with its sharp spines like a porcupine, it is a marvel how they ever manage to transport it without lacerating their mouths or making pin-cushions of themselves after the style of St. Sebastian with his arrows, as portrayed by the old masters. Throughout Arizona the floors of such caves are found covered with a deep bed of chollas. But wherever white men have entered — and the prospectors for mineral have been about everywhere — they have almost invariably set these chollas on fire, for the sake of enjoying the spectacle of seeing the animals scamper out of the place in terrified swarms. The chollas are exceedingly inflammable, and blaze like tinder. The fire communicates to the accumulated guano, and smoulders down beneath the surface to a considerable depth. Thus, when the cave is a sacrificial one, as is apt to be the case, great quantities of precious relics are heedlessly destroyed to afford a moment's diversion for unthinking men.

This cave had, of course, shared the usual fate. But several months before, when Mr. Cushing had visited it, he had found a number of interesting sacrificial relics, and the indications were that a systematic search would reveal rich finds. So Ramon and the laborer took pick and shovel and began to dig over the floor from the entrance inward, and Mr. Cushing and I grubbed in promising-looking corners. The floor was covered with the broken fragments of rock that had been falling from the roof and sides through the ages, covering it to a depth of three or four feet. All this was imbedded in guano and a surface of loose ashes. Our search was soon rewarded, for relics abounded everywhere. How long the cave must have been used for sacrificial purposes cannot be conjectured. The relics must have existed by thousands before the fire, for savages never disturb a sacrificial place, even of an enemy, fearing to provoke the hostility of the gods and spirits that guard the spot. As it was, we found them in large quantities; both in charred fragments, in whole examples more or less charred, and many that had escaped the fire entirely, protected by their depth, or some intervening rock. The relics were chiefly sacrificial cigarettes, made of cane; also prayer-wands and plumes, and sacred tablets. Great masses of

[1] Continued from page 34, No. 632.

string and fragments of cloth were found, gnawed from the sacrifices by the jnancitos to make their nests. Many of the cigarettes were wrapped with miniature breech-clouts, nicely woven of cotton, some of them with bits of turquoise and other ornaments attached. Some of the cigarettes were in bundles of four, others of six, according to the nature of the sacrifice, or, perhaps, of the rank of the man making it. Some were still filled with tobacco, which, when a bit was burned, had the familiar smell. In spite of the great age, the dryness of the air and, perhaps, the quality of the guano imbedding them, the uncharred relics were mostly as fresh in appearance as when new, even the woven cotton looking clean and white.

In these ancient cigarettes of cane, we find the prototypes of both the pipe and the cigarette. They are always made to include the joint of the cane, which is punctured with a small hole. The hollow on one side of the joint corresponds to the bowl of the pipe, being filled with tobacco, while that on the other side answers for the stem.

What a job we had! Our excavations filled the place with the dust of ashes and finely pulverized guano, which was perfectly dry, and the smell of ashes and guano mingled made a horrible odor. We were nearly suffocated; I felt myself growing sick and sicker, but in the enthusiasm of the search I hardly heeded it until the lengthened shadows, creeping over the plains as we looked from the entrance, warned us that the day was nearly ended, and we had nearly ten miles to go for supper. Don Carlos came with the team, and we emerged in about the most disreputable-looking condition imaginable, with hair and clothing filled with the malodorous dust, and faces grimy with it. But our treasure-trove was worth it; besides many other valuable specimens, it included, counting what were found the next day when Mr. Cushing completed the exploration of the cave, over 1600 of the sacrificial cigarettes.

Before we start for the camp, Mr. Cushing makes a reconnaissance of the butte and comes across a smaller cave. A rattlesnake is coiled up at the entrance, and above he sees a pretty tip of fur hanging from the edge of the shelf of a sort of niche. "Ah, a Pima sacrifice!" he exclaims mentally, and he is about to slay Mr. Snake and lay hands on the ethnological specimen, when the latter stirs and disappears, and in its place appears the other end, the head, of one of the most beautiful and most avoided of quadrupeds, for it was the tail of a sleeping skunk! As there is a chance that the cave may contain some real specimens, he concludes not to spoil it by the consequences of irritating the pole-cat, and he leaves both the occupants in peace.

We ride back in the mild evening air, in the white light of a wonderful silver sunset that seems like warm, glowing moonlight. The side-camp is now at Los Hornos, where the men are engaged in excavations; Dr. Wortman greets us with the news of an important find, in the shape of a fragment of a small copper bell, the first piece of metal-work discovered by the Expedition. A few days later a complete little bell of the same metal is found in the same place: peculiarities of its workmanship tell clearly an important story which Mr. Cushing interprets in the light of his knowledge of Zuñi silversmithing, in which he served an apprenticeship. It tells that it was of pre-Columbian origin, that the art of fusing, smelting and soldering metal was known, and that, while theirs was essentially a stone-age culture they were at the dawning of a metal-age, and that the art of metal-working practised to-day by the Zuñis is, as they have claimed, of native origin handed down from ancient times, and not acquired from the Spaniards.

Among the important investigations made by Mr. Cushing is that of their system of irrigation, which was both elaborate and extensive. The lines of their canals are to be traced for miles and miles over the plains, and a map of the canals supplying the Salado group of ruins is made by Mr. Garlick. Sections of the canals are excavated to reveal the method of their construction, which proves to have been peculiar. The canals contained a smaller channel running along as a sort of groove in the centre, so that a cross-section resembled in outline that of a vessel amidships, the smaller channel corresponding to the keel. The purpose of this was apparently to secure the maintenance of a flow in the smaller channel when there was not water enough available from the river to give a flow in the large channel, the narrowness of the former giving a depth and a velocity, with the minimum of evaporation, such as would have been impossible with the shallow flow in the flat bottom of a broad canal without this supplementary device. It appears likely, also, that the canals were used for navigation by rafts of reeds, corresponding to the balsas in use in the Colorado River and the Gulf of California to-day, as well as in Peru and Bolivia. So long has been the time since these canals were in use that in many places they are filled by the action of the elements to a level with the surface of the country, and it was not until the growth of the vegetation of spring-time that their course could be traced, being then marked by lines of bare ground between masses of flowering plants caused by the gravelly banks, and the richer soil between and on either side. These lines were shown beautifully in some photographs.

In the excavations of the canals it was found that the supply-ditches led off just above the level of the supplementary, or keel, canal. To prevent the wearing away of the bank and consequent shoaling at the point of junction, the acute angle at the branch was hardened by burning it under a hot brush fire, being baked to a coarse terra-cotta, and a projection from the opposite bank to deflect the water into the branch channel was similarly treated.

Sylvester Baxter.

AUGUSTE RODIN, SCULPTOR.[1]—II.

Though Rodin now began to earn a little more money, and was pleased with the change in the character of his vocation, his troubles were by no means at an end; in fact, the worst one was about to begin. If he had endured many annoyances during the past six years, he had at the same time enjoyed a large amount of pleasure in the pursuit of his studies. They had enlarged and deepened his artistic insight, sharpened his sensibilities, given greater authority to his instincts, and begun to formulate an exacting judgment so far as his own work was concerned. All this had become a force which he hardly realized. He had made great progress: he was a sculptor; young, but going at a great pace over a safe route, and free from any serious obstacle. He had constantly worked from life in his own studio, always seeking the finest points of his art, the harmonious arrangement of masses, and the severest sculpturesque effects; working slowly, thinking much, observing clearly, and trying to reproduce his model with exactness in all its outlines, interior and exterior. It was his only and his sole way of getting happiness—endeavoring to make good sculpture. But when he began with Belleuse he found that the latter's method of producing sculpture was entirely different; that the main object was to please the uncultivated, often vulgar, fancy of the commercial world. To accomplish this, the living model was dispensed with, haste took the place of thought and observation, a bad style of modelling was practised, and a manner of finishing equally reprehensible. To Rodin this was unpleasant and injurious. All that he had so painfully acquired during the past six years was now to be made subservient to this method simply to gain his daily bread. He regards the time spent with his new employer as having been of great injury to him as an artist, and that, had it not been for the intense urgency of his temperament and the persistent habit of working at home from life, it would have ruined him. The advantages of increased facility in handling clay, which he acquired with Belleuse, "were nothing," he says, "in comparison to the free and healthy development of his own instincts." Of some of his experiences during the seven years with Belleuse, Rodin observes: "Though I was making poor sculpture for Belleuse, I was always thinking to myself about the composition of figures, and this helped me later on. I carried to the work I did for him the result of my study at home. He occasionally praised me, though not much or often, and rarely, if ever, criticised. I knew he liked what I did. He was too much of a business man to praise much, for he did not wish to raise my wages. He was no common man, was very intelligent, understood his own kind of work, and was lucky to have me for the price he paid. I think, in sentiment, Belleuse was an artist. He had good ideas of arrangement, a pretty correct eye, and composed well, though he had never been able to study. He could make a sketch that no one could finish as well as myself, and he did not always know this. He was a man of his day in sculpture. Nothing that I ever did for him interested me."

In 1864–5, Rodin ventured to carry to the *Salon* "The Broken Nose," but it was refused. This was a blow as cruel as it was unjust. It hurt his pride so much that he did not try again to exhibit anything at the *Salon*. It cut off whatever benefit these exhibitions might have brought him, and prevented all professional recognition. Its effect, for a long time, condemned him to the life of a workman. He had, so far, been unable to form any relationship that could help him along in the world, either as a man or as an artist. The refusal of the *Salon* to accept the mask deprived him of his last and only hope. Save for a devoted wife, he was utterly alone.

But all this did not discourage him. He continued to work harder than ever, if such a thing were possible, and in his own way. The love of his idea of sculpture, without any disturbing consciousness that he possessed any especial merit as an artist, pushed him on. His rooms were filled with sketches of every description, with plaster-casts of "The Venus of Milo," "The Dying Gladiator," and other Greek plasters, and always a clay-figure under-way larger than life. His moments of deepest despair were caused by his never knowing whether or not he was making progress, while his burning ambition was to make good sculpture—to produce a figure as thoroughly modelled as "The Broken Nose."

"At my work," he says, "I was never sad. I always had pleasure in it. My ardor was immense. I was always studying. Study embraces it all. Those who saw my things pronounced them bad. I never knew what a word of encouragement was. The little terra-cotta heads and figures that I exposed in shop-windows never sold. So far as the world went, I was shut out from it, nor did I know that it could be of use to me. I went to the *Salon* and admired the works of Perraud and other leading sculptors, and thought, as ever, that they were great masters, though in their sketches I saw that they were not strong. In looking at the hands they made, I thought them so fine that I never should be able to equal them. I was all

[1] All rights reserved. Continued from page 29, No. 682.

this time working from nature, but could not make my hands as good as theirs, and I could not understand why. But when I got my hands all right from life, I then saw that theirs were not well made, nor were they true. I now know that those sculptors worked from plaster-casts taken from nature. Then I knew nothing about casting from nature; I only thought of copying my model. I don't believe those sculptors knew what was good modelling and what was not, or could get out of nature all there was in it. As my memory was good, I copied in those days, at home, the pictures I admired at the Louvre. Many of the things I made in my studio were better than anything I have since executed, and, had I been less negligent, some of them might have been preserved. I would now give many thousands of francs if I could have some of those figures. Since then I have known the value of good friends, but, if I could have had even one in those days, it might have been a world to me. Then I did not know that my work had any merit."

The thousand and one encouragements and helps that young artists usually receive, and without which few of them would ever succeed to any recognizable degree, Rodin knew nothing about. He never came into close and instructive contact with any master, never thought of asking one to see and criticise his work, because he supposed them too great to be approached by humble students like himself. Besides, he felt that by hard work he could carry to fruition the expression he had used to his mother — "I will work it through myself."

When other young sculptors were receiving medals at the *Salon*, and were being encouraged by the government with prizes and commissions, Rodin thought that they must be very happy, though he did not envy them or repine at his own humble lot. His world and the world around him were wholly distinct from each other.

When the Franco-German War broke out work with Belleuse came to an end, and Rodin applied himself harder than ever to the pursuit of his studies. He was then living in the Montmartre quarter, and had a studio in the Rue Hermel, very near the city-wall. Like every other able-bodied citizen of Paris, he joined the National Guard, and served the hours required of him as a corporal. He had no money, food and fuel soon became scarce, and misery, cold, and hunger were almost unendurable. They were at first glad to eat horse-meat, and at last a small piece of hardly eatable bread was all they had. To make two busts in terra-cotta of the officers of his battalion, for six dollars each, was a veritable godsend.

Fortunately for Paris, the war came to an end, the city was supplied with food, and Rodin managed to get money enough before the Commune began to start him for London, where he hoped to find work, though he knew no one in that city. As his old employer, Belleuse, was in Brussels, Rodin took that way of reaching his destination, thinking that he might be again employed. In this he was successful, and he began for the second time to put into shape the sketches of this enterprising sculptor. After he had been at work for a few months at the extravagant salary of thirty cents an hour, Belleuse made an exhibition of his things, and Rodin, also, put some of his own terra-cotta heads and figures in a shop-window in the same street where those of Belleuse were, but without the slightest idea of competing with him. He soon learned, however, of the danger of even a similitude of competition with a business sculptor. When the next pay-day came round, Belleuse parentally suggested to Rodin that it would be a good idea for him to rest awhile.

Although no reference was made by Belleuse to the two exhibitions, Rodin saw the point. It was a discharge, and the workman accepted it, though he was considerably surprised. Nor was it very agreeable, for he had just sent all the money he had to Paris, save ten dollars; he was in a strange land, had not enough to proceed to London, no prospect of work in Brussels, and only this small sum to depend upon; and even this had come from Antwerp, in payment for some terra-cottas which he had sent there before the war. With the ten dollars Rodin laid in a stock of provisions, a good ham being the chief reliance, and determined to work for himself and do a little waiting for events.

In the meantime Belleuse had made a successful sale of his works, while Rodin had not sold anything. The heads and figures that he had made for Belleuse sold for many thousand per cent more than they had cost him, and it puzzled Rodin to think that he should be discharged by an employer who was making such large profits on so small an investment. In about three weeks Rodin had consumed his store of food and was wondering what to do next, when he encountered a Brussels sculptor, named Van Rosbourgh, who had some talent for making figures of infants, and who had worked for Belleuse in Paris before the war. Finding Rodin unemployed he proposed that they should form a partnership for the purpose of executing some large works of sculpture that he could get to do from an architect who was erecting some public buildings in the city. Rodin agreed to this proposition, on the conditions that he should sign no contracts, but share equally in the profits. As it soon appeared that Van Rosbourgh was a good-for-nothing drunkard, as well as a worse than useless assistant in the studio, Rodin dispensed with his services, kept him out of the studio as much as possible, and did all the work himself.

This sculpture consisted of two large groups for the outside of the Money Exchange, and two large caryatides for the inside. For the King's and Ducal Place and the conservatory, each, two large bas-reliefs, and other decorative figures for private buildings. Rodin went at his task with vigor, and pushed it along with an untiring enthusiasm. His models, made partly from life, were four feet high, or one-third the size of which they were executed in stone.

The Money Exchange sculpture, Rodin learned afterwards, had been promised to Belleuse, but Van Rosbourgh had sufficient influence to get it away from him. He also learned that the fact of his being a Frenchman was the real reason why all his work was given to the company to do. The prices they received were very moderate, and though Rodin worked very fast he could succeed in gaining merely ordinary wages.

In 1874, soon after the completion of the Brussels commissions, they were engaged to go to Antwerp, to make a monument in commemoration of J. F. Loos, a Burgomaster.

The commission for this structure had been given to a rich ship-owner, who had the ambition to pose as a sculptor. He agreed to pay the two sculptors two thousand dollars for making the plaster models of five figures, life-size. But Rodin, thinking it a good opportunity for the credit of all concerned, to do some extra fine statues, decided to make them full-size, or nine feet. Unfortunately he was throwing pearls before swine, and received the reward often meted out in payment for generous actions, for the contractor would only pay fourteen, of the twenty hundred dollars promised; though he was very willing to put his name on the monument, as its author. Nor did Rodin's annoyances begin or end here, and of them he says: "I made the figures as I pleased, as I did everything I ever made, but our employer did not like them. He wanted them in the Rubens style of sculpture, and he would come to the studio when I was absent — he did not dare to come when I was there — and oblige Van Rosbourgh to alter them, to their great injury. I left them hardy and vigorous, but Van Rosbourgh's changes, and the wretched way that they were executed in stone, have made them round, heavy and lifeless. I was so disgusted with this that I lost all interest in the figures, and never went near them while they were being cut. Miserably as this was done, the workman gained more money for what they did than I got for the models. Although I was in feeble health, a severe cough making my nights wretched, I worked on those figures with the greatest ardor from a decorative point-of-view, and it was while I was making the figure of the sailor that I was struck with its resemblance to the statues of Michael Angelo, though I had not had him in my mind. The impression astonished me, and I wondered what should cause it. I had always admired Michael Angelo, but I saw him at a great distance. My studies had been a blind search after the movement of figures, and in making this one, I was, for the first time, impressed with its resemblance to the compositions of the great Florentine. I tried to understand and explain it to myself, but could not. My interest and curiosity were greatly awakened, and to satisfy my mind of the reality of this resemblance, and to confirm my hope of its depth and value, either as the result of my long years of effort, or as the effect of my admiration for him, I made a lot of sketches to see if I could get the same character, but without success."

As badly as the figures on the monument were executed in stone, they produced sufficient effect in Antwerp, upon the public, to cause it to suspect that they were not the handiwork of the person whose name was upon the structure. This suspicion grew to such proportions that he went to Van Rosbourgh and earnestly advised him to get rid of Rodin. "But how can I do it?" said the latter, "he is a very valuable man." "Easy enough," answered the disturbed ship-owner, "Don't give him any more work." The suggestion was potent, the partnership was dissolved and Rodin, again the object of brutal treatment, returned to his old studio in Brussels, at 114 Rue Sans-Souci, and began, with the little money he had saved by the greatest economy, "The Age of Brass." Knowing a captain, connected with the Belgian War School, Rodin asked him to send to his studio some of his young soldiers that he might select a model. Of the eight or ten thus placed at his disposal, he selected a Flemish youth, of twenty-two years of age, named Neyt, a fine noble-hearted boy, full of fire and valor.

T. U. BARTLETT.

(To be continued.)

THE LUMBERMEN'S DEMAND FOR A NEW LIEN LAW.

THE annual agitation of the Massachusetts lumber dealers in favor of legislation giving to material-men an absolute lien without notice to the owner and irrespective of payments made by him to the contractor, or, as they ingeniously put it, the repeal of the "law requiring notice," has begun again; and a more vigorous effort than usual is being made, by the subscription of money and the circulation of petitions, to make that impression on the Legislature which previous efforts in this direction have failed to produce. For a number of years past the lumber dealers have petitioned the Legislature for such a law, invariably without success; and there is little danger of this year's movement proving successful; but it would be well for owners, contractors, architects and the public generally to keep an open eye upon the lumber dealers' movement, and be prepared, if necessary,

[1] See the *American Architect* for June 25, 1887.

to resist the bill by organized effort. Hardly any scheme could be devised more unjust or inequitable in itself, or more likely to injure the interests of all persons engaged in building operations, than this plan of putting material on a par with labor, and giving an absolute lien to both.

Owners of real estate, of course, will object, because it would compel them, without any means of self-protection, to run the risk of paying for the material that goes into their buildings, twice over. Practically, the large owners, capitalists and trustees, who would be apt to employ legal advice before building, would not be the ones to suffer; for they could and would protect themselves either by exacting of the contractor heavy bonds with responsible sureties, or they would withhold until the end of the job a much larger proportion of the contract money than is now customary. So far as the owners of real estate are concerned, it is the men of moderate means who build houses and stores for themselves to occupy, upon whom the burden of the proposed legislation would mainly fall.

Contractors, however, would suffer heavily. The smaller ones would be driven out of business entirely; those possessed of moderate capital would not be able to swing so many contracts as under the present system; and a great part of the business, that relating to large buildings, at least, would tend to concentrate itself in the hands of the few builders possessed of sufficient capital or credit to get along without large advances on their contracts, or who could furnish good security. They would also suffer by reason of the undue power which the material-men would have over them if any dispute should arise as to the quality of the material furnished: disadvantageous and inequitable settlements could be easily forced by the material-men, by threats of stopping the advances by putting on a lien.

This whole question concerns the architect also; for although he has no pecuniary interest in the matter, yet if, as would inevitably be the result of this legislation, the cost of building houses should, in many cases, far exceed the estimated sum, the blame would, rightly or wrongly, be thrown upon the architect, and he would be censured for selecting irresponsible contractors, or permitting unscrupulous sub-contractors to furnish material.

We think that on the whole and in the long run, the material-men themselves would not gain. Those among them who want the privilege of selling goods to an obviously irresponsible contractor might, perhaps, save a debt here and there; but the general result to material-men, as a class, would not be beneficial. Anything that tends to increase the cost of building must tend to diminish in like proportion the amount of it; and probably the new business methods, which the change would necessitate, would compel material-men either to give longer credits, or to waive their lien. Furthermore, it is fair to assume that any material-man who should make a practice of selling goods to irresponsible contractors, then lie by without giving notice to the owner, lulling him into paying out the contract money, and then jump upon him with a lien when the building was done and the money all paid, would not get extensive employment from the architects' offices.

The only people pushing the matter are, curiously enough, the lumber dealers. Why these people alone among material-men should be so persistent in their demand for this change is a little difficult to understand, unless it be that the business methods of the lumber trade are particularly lax. At a two-days' hearing before the House Judiciary Committee, last year, where the lumber dealers were out in force, the two most prominent facts brought out were the alleged desire on their part to drive the cheap contractor out of business, and the wholly mistaken idea that the legislation, such they demand, is common in this country. Their real object is, of course, not to drive out the irresponsible contractors, but to do all the business they can with them, and then, through the intervention of the State, make innocent third parties pay for their materials twice over.

Nor has such legislation commended itself to the judgment of legislators in other States of this country. In only five States, viz., Maryland, Delaware, Kansas, Missouri and Minnesota and seven Territories, has such a law been enacted; and in some of these there are qualifying provisions for the protection of owners. In Pennsylvania, New Jersey, and, we believe, also in Virginia, similar laws have, at various times, been upon the statute books, but have been repealed. In none of the States and Territories in which the lumber dealers' scheme obtains, is the collection of debts facilitated by any right of attachment on mesne process such as we in New England are familiar with. The claim of the lumber dealers that the great State of Massachusetts should ignore the essential principles of right and justice, disregard all the precedents furnished by the rest of the New England States, by the great commercial, industrial and building communities of New York, Pennsylvania and Ohio, in fact of every State and Territory in this country, except those mentioned above, and take its building laws from the new and thinly settled territories of Arizona and New Mexico, is preposterous and altogether unlikely to prevail.

[To be continued.]

A Church Moved by a Tree Root.—The foundation of a church in San Luis, Cal., has been shifted seven inches by the roots of eucalyptus trees, and the latter are therefore to be cut down. The trees are perfect giants, their tops reaching thirty feet above the church's steeple. — *Cleveland Leader.*

Exhibition of Dürer's Engravings at the Boston Museum of Fine Arts.

There has been lately, at the Museum of Fine Arts in Boston, a collection of engravings, etchings and wood-cuts by Albert Dürer, which remained on view until the middle of January. For an opportunity to study many of the prints, the public was indebted to Mr. Henry F. Sewall, of New York, and the rest were drawn from the Gray Collection of Engravings belonging to Harvard College, but now in the custody of the Art Museum. The admirable annotated catalogue prepared by Mr. Koehler, Curator of the Print Department, records 275 numbers, and among them eight original drawings by Dürer, from the Collection von Franck, lent by Mr. F. Meder, of New York. We have heard of "original" paintings by the great German artist being in the possession of some of our highly favored fellow-countrymen, but here were some authenticated drawings — drawings which are accepted by such authorities as Heller, Thausing and Ephrussi — for our inspection. They include a "Portrait of a Woman"; a "Head of the Virgin"; a study for the left arm of Eve, for the painting of "Adam and Eve"; one for the foot of an apostle in the picture of "The Assumption of the Virgin," and three studies, in pen-and-ink, washed with color, for the details of the portrait of Charlemagne (now at Nuremberg), showing the Imperial crown and orb, and a part of the sword of the mighty Emperor. Among the prints were to be found all of Dürer's masterpieces, his "Great" and "Little Passion," his "Apocalypse," his "Life of the Virgin," his "Adam and Eve," "Melancholy," "Knight, Death and the Devil," "St. Jerome in his Cell," and "Great" and "Little Fortune," with other prints familiar enough and many more not often seen.

One of the most remarkable things was the "Arch of Honor," or "Triumphal Arch," designed by Dürer in honor of the Emperor Maximilian, an immense drawing which was engraved upon ninety-two blocks of various sizes, measuring, when put together, nine feet wide by ten-and-one-half feet high. Impressions from but thirty-six of the blocks were exhibited, but there was a modern (photomechanical) reproduction of the whole arch, reduced in size. Unfortunately, however, this so folded as to hide a portion — we suppose because of want of space. This "Arch" was drawn upon wood from Dürer's sketches, mainly, it is supposed, by Hans, Albert's brother, and Hans Springinklee. It was cut by Hieronymus Andrea, and is dated 1515. The work was intended to represent a Roman triumphal arch, but its style is that of the period of the early German Renaissance, and it is covered with fantastic and symbolic ornamentation, while some of the details recall Venetian architecture. The arch has three gateways. Above the central one (the "Porch of Honor and Might") is the genealogical tree, reaching back to Troy, of the Emperor; while over the side-gates (called of "Praise" and "Nobility," respectively) are twenty-four scenes from the life of Maximilian; and the arch, also, bears representations of his predecessors and the princes with whom he was allied, with a profusion of other figures and coats-of-arms. The inscriptions and explanatory text are by Stabius, the Emperor's historiographer and poet-laureate, and the whole is a marvel of minute precision and exuberant fancy, quite impossible to describe, but worthy of the most careful examination and study. Intimately connected with this arch are the prints of the twenty-four blocks which Dürer drew for Hans Burgkmair's "Triumphal Procession of Maximilian." As an example of Dürer's architectural drawing, the large wood-cut, in two pieces, of "The Siege of a City," with its representation of a fortified mediæval town towards which is advancing an enemy's army, its advance guard already in close combat with some of the besieged, should be noticed. Look, too, at the background of the little "St. Anthony," supposed to show the city of Nuremberg, with the high roofs of its quaint half-timbered houses guarded by castle towers. The saint, free for a time from besetting visions of foul fiend and lovely seducing woman, is here quietly studying his prayer-book; near by his staff has been stuck in the ground and from below its double-cross hangs a bell, signifying the power of the saint to banish evil spirits. Another most finely executed landscape, with buildings, may be seen in the "St. Eustace" (generally, but mistakenly, called "St Hubert"), Dürer's largest plate; and there are wonderful glimpses of distant cities crowning rocky hillsides, or sloping gently to some calm river-shore, in many others of his prints. For examples of his marvellously fine and firm decorative drawing, see the "Coat-of-Arms with the Skull," the superb "Coat-of-Arms with a Cock," and several similar plates. Not all of our readers, perhaps, know that Dürer, who in the universality of his genius, recalls Leonardo, was a competent architect, though he designed little, nor is it known that he ever practised. He wrote upon architecture, also

a book on fortification, and, in the manuscript works he left behind him, may be found extracts from Vitruvius, reproductions of old capitals, plans for the construction of the cupola of St. Peter's at Rome, and various other plans and illustrations.

COMMUNICATIONS

PROGRESS OF THE ARCHITECTURAL SOCIETIES' CONSOLIDATION MOVEMENT.

NEW YORK, N. Y., January 17, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Accompanying is a synopsis of the proceedings of the meeting of the Committees on Consolidation of the A. I. A. and W. A. A. held on January 7th, 8th, and 9th.

Pursuant to the resolutions adopted at the late conventions of the American Institute of Architects and of the Western Association of Architects, the committees appointed by the two societies, met on January 7th, at the rooms of the American Institute in the Welles Building, New York.

There were present, on behalf of the Institute, Mr. Littell, Chairman, and Mr. E. H. Kendall of New York, Mr. A. Stone of Providence, and Mr. James G. Cutler of Rochester. Mr. D. H. Burnham of Chicago, the fifth member of the Institute Committee, being unavoidably absent, had sent a letter setting forth his views.

The Committee representing the Western Association consisted of Mr. D. Adler, Chairman, of Chicago, Mr. W. W. Carlin of Buffalo, Mr. John W. Root of Chicago, Mr. A. Van Brunt of Kansas City, and Mr. George B. Ferry of Milwaukee, all of whom were present.

On coming together informally, Mr. Alder gave a statement of the position of the committee in its representation of the views of the W. A. A.; its main feature expressing the belief that any system of unification, to carry the vitality necessary to success, must be based on principles of equal fellowship. The committee then separated to consider and act upon this proposition.

The Institute Committee also took up the communication presented from Mr. Burnham. On reassembling, after these separate sessions, a committee of the whole was formed. Mr. E. H. Kendall being chosen Chairman, and Mr. George B. Ferry, Secretary. The committee at once proceeded to consider the various matters incident to the scheme of consolidation, which embraced: the draft of a Constitution and By-Laws, a circular letter to the members of each association, and the recommendation of a place for holding the first convention.

Then followed three days of active hard work, characterized by the most hearty co-operation on the part of every member of the committee.

The discussion was full, broad and of the most cordial nature.

Every effort was made to embody such features in the rules to be recommended as would promote the vitality of the new organization.

The belief prevailed that every stimulus should be given to the ambition of members, to seek preferment at the hands of their associates; also that much of the animosity and ill-feeling arising between individuals was due to a lack of acquaintanceship.

To promote good fellowship, the annual convention, with its attendent social features, was looked upon as an essential requisite, and steps were taken to prevent the burden of expense falling upon the Fellows resident at the place of meeting.

It was also believed that the administration should be left within the control of the convention, to the utmost degree; while the executive portion should be administered by the fewest number necessary for the efficient handling of the work.

Nothing was more agreeable to the members of the committee than to find that anticipated fears of disagreement were entirely groundless; and it is believed that every member carried away with him, not only feelings of the most agreeable nature as to the work accomplished, and the cordiality of relations between the members, but the belief that the scheme of consolidation, as formulated, will meet with approval on the part of the members of each association, and that it will mark an important event in the history of the architectural profession in this country. EDWARD H. KENDALL.

Chairman of Joint Committee on Consolidation.

HOW TO PUNISH A SCAMPING GAS-FITTER.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Is there any way of obtaining satisfaction from dishonest contractors who have no money? A gas-fitter takes a contract to pipe a house for thirty dollars. He runs the pipes for the drop-lights through the middle of the rooms the whole length of the house, and saws all the beams nearly in two in the centre, to make a notch to lay the pipe in, although his specification expressly forbids the notching of any beam more than two feet from the bearing. He puts in a piece of split pipe, mended with putty and red lead, under the floor, and lays the pipes with a fall in miscellaneous directions, and with bracket outlets at all varieties of height from the floor. The carpenters, without saying anything to me, put a row of shores through the middle of the parlor and dining-room, to keep the floor above from falling, and complete the house. It is then discovered that the chamber floors sag frightfully when any one walks over them; that there is a copious leak in the floor, but that the gas—naphtha, refuses to emerge from most of the proper outlets, through the trapping, by condensation, of the numerous bends and hollows in the pipes. After enduring this as long as possible, the second story beams are removed, and replaced with others, not notched; the plastering is stripped off the walls and ceilings in both stories, new gas-pipes put in, and the plastering, flooring and finishing done over again, at a cost about fifty times as large as the amount of gas-fitter's contract. He has not a cent, and is in debt for beer. From whom can I get satisfaction? Is not the carpenter at fault for going on and completing, without notifying me, a building the strength of which the gas-fitter had destroyed? If not, is there not some way of recovering judgment against the gas-fitter and sending him to the debtor's prison? Or is there no such thing as a debtor's prison, or any other place where he and his like can be shown the error of their ways? SIXEX.

AN EXPERT IN SCHOOL HOUSES.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—A rather novel competition, if it may be so-called, came under my notice recently which may interest your readers, and comment on the same by yourselves may not be lost on the committee whom the citizens have vested with power to act in their service and who are, of course, responsible to them in the matter. The facts are these: a certain city being about to increase her school accommodations, were besieged by architects of all sorts to secure the job, until it finally came down to a matter of the price at which they would do the work. Some offered their full services without compensation! Finally, a selection was made of one who represented to the committee that he was building numbers of school-buildings, which the committee evidently swallowed easily enough, while, in fact, the only school-houses he was superintending were under investigation which resulted in his dismissal for certifying to payments for the builder when the work was neither done in a correct manner nor as per drawings and specifications from the foundation, and the specifications had provided for only 2 x 10 joists for long spans over large school-rooms and in other ways were entirely inadequate, if followed to the letter. Later, this same architect was engaged as an expert witness to give testimony in an action with a builder, and, after he had given his evidence the learned counsel on the other side on cross-examination, killed this expert testimony by asking him about the schools he had just been employed to superintend and if he had not been dismissed on account of incompetency, which question he tried to dodge, but chagrined, he finally admitted. This city has, I think, fallen into bad hands, and would have done better if an architect that is both capable and honest had been employed by them to take charge of the expenditure of a hundred thousand dollars or more of money, even if they had to pay five to seven per cent for his services. SIXEX.

[We think our correspondent must be mistaken in asserting that "architects of all sorts" besieged this committee to secure the job.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE PETCHIKAPOU WATERFALL.—Marvellous stories are related by the few Montagnais and Nascapee Indians who have penetrated far into the interior of Labrador respecting a cataract, beneath whose terrific leap Niagara pales into insignificance. But one white man has ever seen these falls, and the Indians' ideas of measurements and distances are so imperfect that, even where their stories agree, it is exceedingly difficult to deduce from them anything like reliable data. An expedition lately undertaken by Randle F. Holme, F. R. G. S., and H. Duff, Fellow of All Souls' College, Oxford, to explore the interior of Labrador and investigate these falls, unfortunately, failed in its object, the explorers having been misled by erroneous calculations as to distances and the exact location of the cataract, and compelled to return in consequence of running short of provisions. They got so near to the object of their expedition, however, that they were enabled, from the general configuration of the country, to form what must be a tolerably correct estimate as to both the location and magnitude of the cataract. This estimate agrees with the description of the grand falls furnished by Maclean, who visited them in 1839, and whose further progress into the interior was stopped by them. He gave the width of the river immediately above the falls at 1,500 feet, but says that the cataract itself is not more than 150 feet across. The height of the falls he estimates at 2,000 feet. This estimate is indorsed by a half-breed named Kennedy, met by Messrs. Holme and Duff in the interior, and who thirty years ago was in charge of Fort Nascapee on Lake Petchikapou. One of the chief difficulties encountered by explorers desirous of reaching the falls is the obstinate refusal by the Labrador Indians to approach them. They believe them to be haunted, and think it impossible to look upon them and live. Kennedy was conducted to them by an old Indian named Louis-over-the-fire, who, being an Iroquois did not share the superstitious belief of the Montagnais and Nascapees. Messrs. Holme and Duff were principally misled by the erroneous statements and calculations as to distances contained in Professor Hind's "*Labrador*," the leading authority upon this virtually unknown country. The falls

are on the Grand or Petchikapou River, which flows into Hamilton inlet. They are thirty miles above Lake Waminikapou, a body of water which is itself forty miles long, and situated 150 miles inland from the mouth of the river. Professor Hind gives this lake as only 100 miles from the mouth of the river, so that the expedition of Messrs. Holme and Duff has brought to light the fact that the best works heretofore published upon this terra incognita contain anything but reliable data. They agree, however, with Professor Hind that the elevation of the immense tableland which forms the interior of Labrador is about 2,250 feet. On this height of land are a succession of great lakes, joined by broad, placid streams, and when these reach the edge of the tableland they commence their wild career to the sea. The Moisie and the Coldwater Rivers descend by successive falls, but toward the southeast the descent from the elevated tableland is quite sudden. This is particularly true of the Grand River, which has a drop of over 2,000 feet in the thirty miles commencing with the falls and ending at Lake Waminikapou. There is a slight rapid below the falls, but none near the lake, and everything goes to show that the height of the grand falls is very little, if anything, short of 2,000 feet. They are by a great deal the highest falls in existence that are composed of any great volume of water. There are many mountain torrents that fall from a greater height, and the great fall of the Yosemite Valley measures 2,550 feet, but it is broken into three distinct leaps. Niagara, on the other hand, has a height of 164 feet only.—*Boston Herald.*

Engine Foundations.—An engine foundation, says the *Age of Steel*, bears the same relationship to the structure which has afterward to be raised upon it as does the carefully laid basis upon which a substantial building is to be erected. This being so, too much care cannot be exercised in its construction. A good foundation will in many cases partially compensate for the defects of a bad bed, in the case of a fixed engine; but of course the latter ought to be firmly bolted to the foundation so that the two form one immovable mass. It should be bedded and tied in such a manner that no unequal settlement can take place, for should it cause this, there will be a danger of springing in the bed, and of heating the bearings as a result of these being twisted out of parallel. The higher the speed of the engine the more substantial should be the foundation, for vibration and tremor ought especially to be absent in the settings of a high-speed engine. A good bottom of concrete is perhaps the best substance to make a start with, but its size might of course to be determined by the nature of the soil upon which it is to rest. If it is a rock bottom the bed can of course be fastened directly to it with but a mere premise for a foundation between; but should it be sandy or wet a concrete surface of large area should be first laid. Then should follow the bricks, laid close and jointed with the best cement, or if it is proposed to use stone the larger the blocks used the better, the bonding of course being particularly studied. Rubble work is not to be recommended, as the irregular shape of the stones forms a very unreliable bond, and the cement which this kind of work requires is not calculated to add to the stability of the foundation. The bed or engine frame should never be bolted down until the foundation is completed and thoroughly set; when in position and found thoroughly true, the joints may be filled and packed with melted sulphur to insure rigidity. With a bad foundation no engine can be expected to run long without deterioration, and there is no part of the detail of engine fixing which is of more importance than the foundation.

The St. Louis Bridge.—The beautiful bridge built by Captain Eads over the Mississippi River at St. Louis, bold in its design and excellent in its execution, is an object of admiration to all who visit it, but the impression of its importance would be greatly magnified if the part below the surface of the water, which bears the massive towers, and which extends to a depth twice as great as the height of the pier above the water, could be visible. There are three steel arches, the centre one having a span of 520 feet, and each side arch a span of 502 feet. Each span has four parallel arches or ribs, and each arch is composed of two cylindrical steel tubes, 18 inches in exterior diameter, one acting as the upper and the other as the lower chord of the arch. The tubes are in sections, each 12 feet long, and connected by screw joints. The thickness of the steel forming the tubes runs from 1 3-16 to 2 1-8 inches. These upper and lower tubes are parallel and 12 feet apart, connected by a single system of diagonal bracing. The double tracks of the railroad run through the bridge adjacent to the side arches at the elevation of the highest point of the lower tube. The carriage road and footpaths extend the full width of the bridge, and are carried, by braced vertical posts, at an elevation of 23 feet above the railroad. The clear headway is 55 feet above ordinary high water. The approaches on each side are masonry viaducts, and the railway connects with the city station by a tunnel nearly a mile in length. The great tubular ribs were built out from each side of a pier, the weight on one side acting as a counterpoise for the construction on the other side of the pier. They were thus gradually and systematically projected over the river, without support from below, till they met at the middle of the span, when the last central connecting tube was put in place by an ingenious mechanical arrangement, and the arch became self-supporting.—*Scribner's Magazine.*

The Duchesse de Galliera's Revenge.—The late Duchess of Galliera, who gave during her lifetime upwards of $30,000,000 to the poor, is to have a statue in her native city of Genoa. Wherever the traveller turns he will be shown schools and colleges, infirmaries and hospitals, alms-houses and model dwellings founded by the Duchess for the benefit of the Genoese. Now that the Duchess is dead no time should be lost in removing from the entrance hall of the Galliera Hospital the tablet which records "to his eternal shame" the treachery of her agent and relative, who decamped with $4,000,000, the money paid to his credit by the Duchess for the building of the hospital. The poor old general, if rumor does not lie, used the money to save a spendthrift son from disaster. At any rate, with the Duchess' death "the tablet of revenge" should cease to disfigure the walls of a noble building which has been erected in the name of charity, which covers a multitude of sins, and of humanity, which condones them.—*Exchange.*

A New Tomb for the Hapsburgs.—It has been decided to construct a new tomb for the Austrian imperial family, the vaults under the Church of the Capuchins affording no more room. More than 100 princely personages are buried in these vaults, which have been the burial place of the Hapsburg family since the early part of the seventeenth century.—*New York Evening Post.*

TRADE SURVEY.

Once more reference must be made to a worn-out topic in order to pick up some pointers for trade and business possibilities. Boston and New York financiers are just at present discussing and considering railroad-building. What lines to build, how much money to invest and, in general, how to look after their railroad-building interests for the coming year. Within sixty days the programme will be completed. There is an anxiety among those who have the greatest interests at stake to have all matters pertaining to the relation of the railroads to the Government disposed of one way or another, right or wrong. If rightfully disposed of, they know that there will be plenty of grand opportunities for good investments. If wrongfully disposed of, they can have the satisfaction of knowing what to do and what course to pursue till things come right again. There is a strong feeling in the public mind that the railroad interests will be put under some sort of control, and a more complete control than is now exercised. Our best authorities do not believe what so many newspaper authorities assert in regard to an over-construction of railroads, on the contrary, they believe that there are opportunities as favorable now as there have been at any time for years past for great railroad-building enterprise. The work is of two kinds: First, the construction of long lines in remote sections of the country, as, for instance, in British America, California, Mexico and South America; and second, the construction of short lines mainly in the Southern States. Financial managers will and indicate in advance what they intend to do. Were they to do so, manufacturers of material would at once take the cue, and at once harden prices. It is to their interest to play a fine game, and, if possible, bring about a reduction for all kinds of material that they will need. It would look as though there were some concert of action in this direction. During the past three months fewer rails have been contracted for than during any like period for five years past. Even in the matter of cars and locomotives, orders have not been up to the apparent large requirements. The same applies to other branches of railroad-building material. The country does not absolutely need more mileage, but a great deal more mileage could be built, and built with safety. There are sections of country through which roads could be constructed with advantage, because of the appreciation in value of real estate that would soon follow. Capitalists do not enter things without a long head. They count from five to ten years ahead. They recognize the fact that productive capacity will steadily increase. That emigration will fill up out-of-the-way places, and that the markets of the world will call for the product of labor of all kinds in increasing supply. For this reason the opinion is entertained in some high circles that despite indications to the contrary we will see some five to ten thousand miles of road built during the coming year. Much of it will not be undertaken before midsummer. There is an abundance of money for railroad work. Foreign capital has been organizing itself to spread over America, North, South and West. Numerous lines of railroad are projected which will probably be built in the course of the next five years, and in less time perhaps. A foreign steel-rail trust is being organized in order to profit by this increasing demand. It is for this that the foreigners have put their heads together. The iron trade is dull. Prices are sinking in all markets South, West and East.

The lumber trade, considering the season of the year, is active. Prices are firm in all markets for hard woods. The Southern interests have combined, and the combination will hold. The Northwestern lumber interests expect a heavy demand in the far West for the coming season. If shipments are not restricted, there will be a greater distribution of Western and Southern lumber beyond the Mississippi than ever before in a single year. One reason for this statement is that there is a great deal of money being borrowed, and the indications point that as much more will be borrowed in the South to prosecute work of various kinds in the West. The agencies that are loaning money on farms report a demand for all the money they can secure. In some quarters payments are not being promptly made, but investors are learning to select their localities where their securities can be best located. The hardware manufacturers throughout New England are getting down to work, and are now running more regularly than during the fall to supply stocks for the coming spring and summer. The nail-factories East are working less than half-time, and in the West are scarcely any better fixed. The makers of wood-working machinery are moving along rather slowly, as the capacity in this direction is fully up to all the requirements. Plough-makers are short of orders. Stove manufacturers are busy; machinery-makers all over the West are crowded with work. The boat-yards along the Lakes will be very busy during the coming season. The pipe-makers expect to have all the work they can do. Natural-gas companies talk of combination. Electricians are looking after a centralizing of control. Real-estate speculators are making large purchases of land in the neighborhood of the growing commercial centres of the West. Every indication is of the healthful sort. Those who are watching the financial features are inclined to think that the present financial policy will result in an astringency at some time during the next two or three years. Such a probability is so remote to worry over. A conference of old-time Greenbackers is called to meet at Washington to formulate plans for a renewal of the greenback agitation. This step is taken thus early because the believers in governmental money anticipate an attack of the banking interests upon the legal-tender issues. They argue that the need of money is increasing, and that the supply is diminishing; that more business is being done on credit now than a year or two ago, and that the control of money is centring into fewer hands. These allegations may or may not be true, but there are signs in business circles of justifying the prediction of a more or less astringent condition of the money-market at some time in the near future. Real dangers are, however, not often seen in advance, and anticipated dangers seldom overtake us. The probabilities are that the financial question will settle itself, and that the control of the currency of the country will not be secured by class interests.

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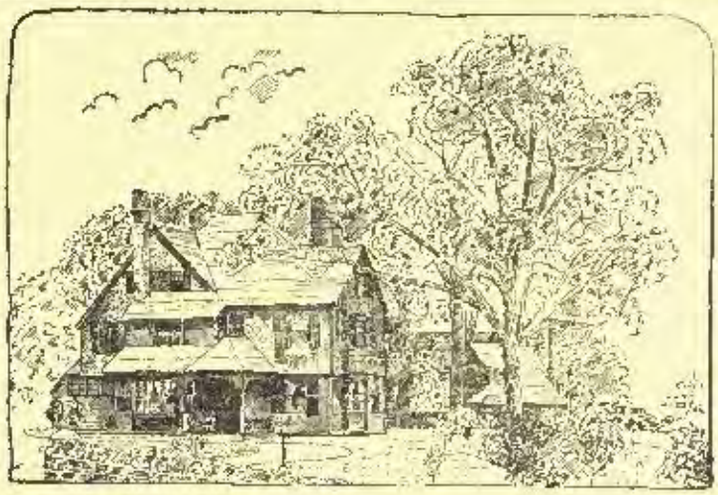

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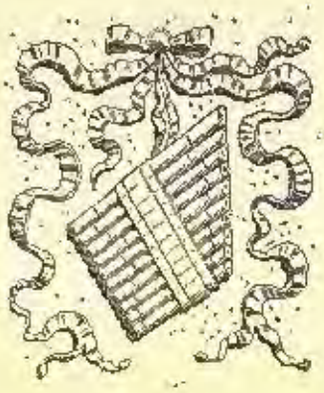

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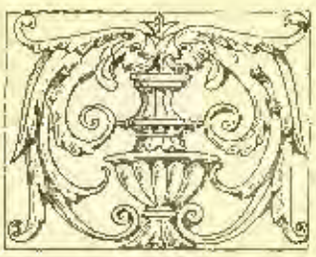
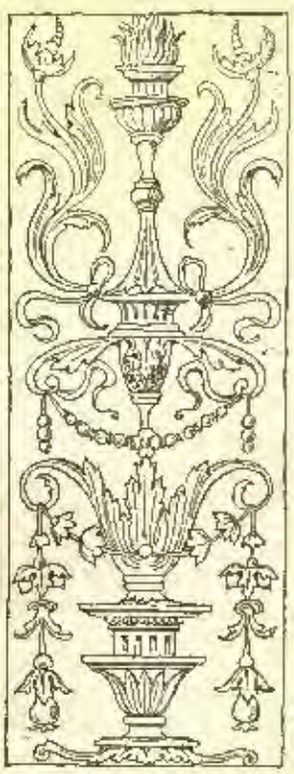


Detail of Tomb
Cathedral of Amiens

Bas-relief. Ch. S. Ouen. 15th Cent.
Pont-Audemer France.

Detail of Tomb
Cathedral of Amiens

Carved Panel : West Museum, London. Engl



The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 79. SATURDAY, JANUARY 5, 1889. Volume XXV. No. 680

DETROIT HEATING AND LIGHTING CO.'S (BOLTON PATENT) HOT-WATER HEATER.

THE ADVANTAGES OF HOT-WATER HEATING.

The advantages of hot-water heating over all other methods are manifold. It is the most healthful system known to the scientific world, the most economical in the consumption of fuel, the most durable and the only one which is absolutely safe; it requires the least care, and in its simplicity outranks the plainest of all plain stoves.

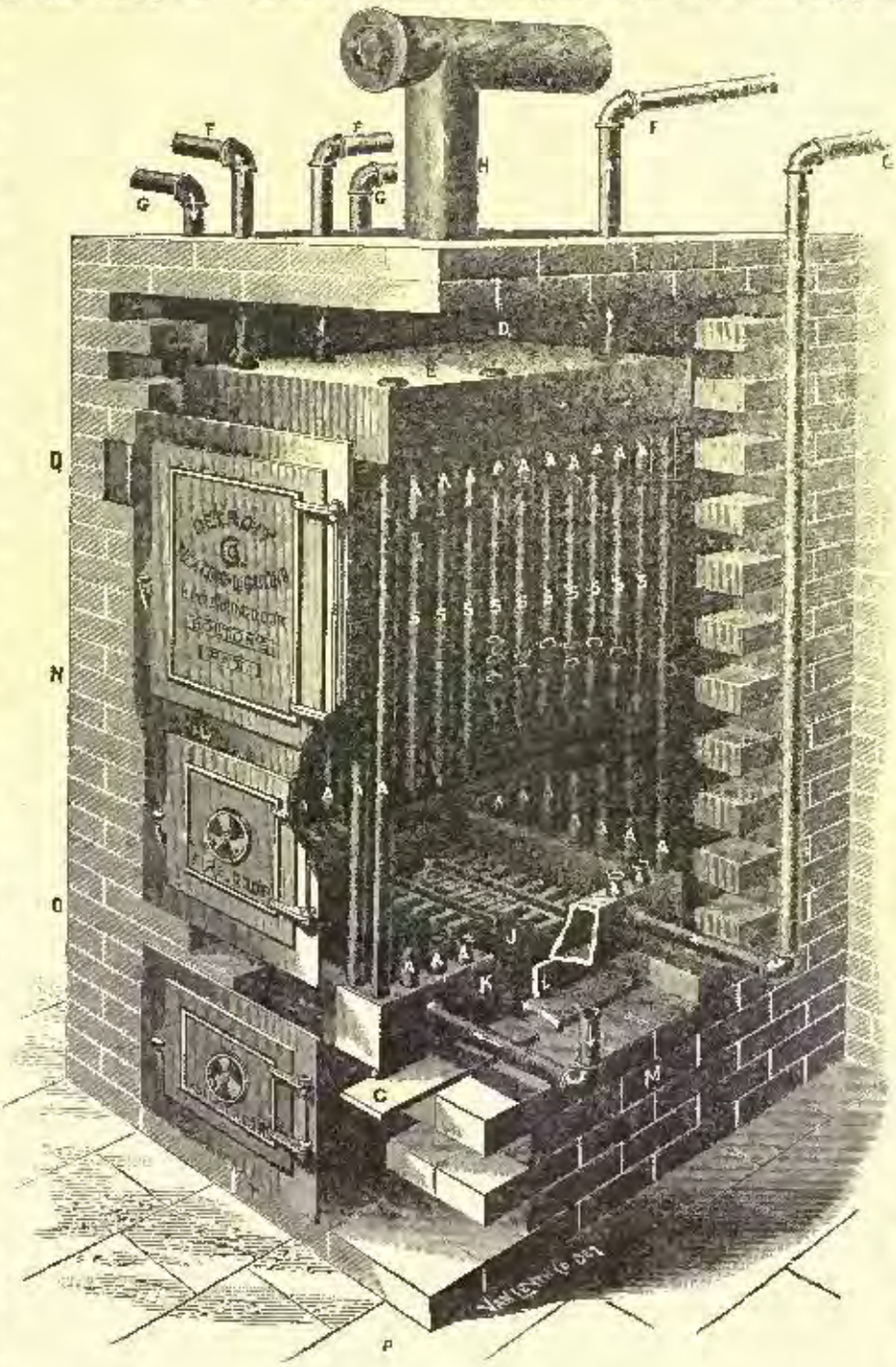
By this system an even temperature, soft and pleasant and free from all poisonous gases, is obtained, and controlled in all parts of the building, regardless of the outside temperature. There are no draughts or blasts of hot or cold air so inseparable with the operations of the hot-air furnaces.

Heat is obtained by the hot-water system as soon as the fire is lighted and continued until after the fire is out and the water cold. With steam no heat is secured until the water boils, and the fuel consumed up to that time is wasted. With the hot-water system the heat is controlled at the furnace, the fire and fuel being directly and immediately regulated to meet the requirements, while with steam the valves of the radiators are made use of and the fuel in the furnace frequently consumed to no purpose. Numerous tests and years of experience prove that a good hot-water system will consume from twenty-five to thirty per cent less fuel than the best steam plants, and from forty to fifty per cent less fuel than a hot-air furnace.

The hot-water plant is not subjected to the wear and tear caused by uneven pressure, expansion and contraction of pipes and regulators that is common to the steam system, and properly put in will last three times as long. Its longevity in comparison with hot-air furnaces is even greater.

The hot-water system cannot explode, as there is never any pressure except the weight of the water, the pipes being open to the atmosphere. There is absolutely no danger from fire, as the fire-box is encased in iron and brick, and the pipes and radiators cannot be heated above 190° to 200°.

The simplicity of a good hot-water system is one of its chief merits. It requires less attention than an ordinary base-burner stove.



THE SPECIAL ADVANTAGES OF OUR HOT-WATER HEATER.

The fire-pot and heater is so constructed that it possesses the largest heating surface of any system now offered the public. (See cut). It is thereby able to heat a larger volume of water in a shorter period of time than any other and is, therefore, more economical in the consumption of fuel. This superiority is obtained partly by using wrought-iron tubes instead of cast-iron, which are thicker and consequently require more heat to affect the water within; partially by the vertical arrangement of the tubes, whereby the water begins to circulate with the first heat (a newspaper furnishing sufficient heat to start the water in motion) and partly by the tubes being brought into direct contact with the heat

in such a manner that no useless fire-bricks intervene or clinkers can form to absorb any portion of the heat.

In point of durability there is no heater that can equal it. In addition to the advantages in its construction, above noted, this heater possesses a merit not to be found in any other. The entire heater is practically one piece, all parts being screwed together. There are no bolts, no flanges and no packings to leak in it — fatal defects that are the source of constant annoyance and frequent repairs in other heaters. Only the very best materials and the most experienced workmanship are employed in its manufacture.

The cut which shows how the heater is encased in brick and iron, speaks of its perfect safety. Its location (generally in the cellar or basement) is further security in this respect. The exposed surface of the covering, either at top, bottom or sides, does not give forth a particle of warmth. A sulphur match left for months on the top will not ignite, and wood, or even paper, can be left on the exposed pipes with perfect impunity.

The extreme simplicity and cleanliness of the heater adds to its superiority over all others. Every portion of the heater is plainly visible, ready of access, and can therefore be cleaned easily. There are no recesses for soot to accumulate in. The fire requires less attention than an ordinary coal stove, a replenishment of the fuel once in twenty-four hours being sufficient during average winter weather, and once in twelve hours being necessary only in extreme cases. No skill is required in firing. Any desired heat can be obtained at once, and an equable temperature maintained in every room in the house regardless of distance from the heater. The heater is entirely noiseless in its operations.

References and further information will be cheerfully furnished upon application to the

DETROIT HEATING AND LIGHTING CO.,
Detroit, Michigan.

"HIS SECOND SUCCESS."

Over twenty years ago, Mr. E. T. Barnum, of Detroit, commenced in a small way the manufacture of wire and iron work. By industry and perseverance the business rapidly increased, and gradually outgrew the different quarters at which it was conducted, finally becoming so large that Mr. Barnum found it to his advantage to incorporate, although he still continued to be the sole manager.

The business was then pressed with redoubled energy. A large factory, the largest in the world, was built and thoroughly equipped with the very best machinery then known, nearly all of which was especially constructed for his work, and an immense fortune seemed to be practically within his grasp.

But one morning Mr. Barnum saw that factory, the reward of the persevering diligence of years, go up in smoke, leaving only the bare, blackened walls. However, with that undying energy which had built up one fortune, he commenced again, even before the smouldering ruins were cold.

This was in 1885. It was a difficult and disheartening task to again trudge slowly along the financial stairs up which he had pressed for so many years, and down which he had been so recently and suddenly hurled, but he kept quietly and steadily at work, and is now again firmly re-established with new works built under his own supervision and for his own special use, and equipped with the latest improved machinery.

The present factory is located at Nos. 715, 717, 719 Grand River Avenue, where everything in the line of wire and iron work can be had, and any special order promptly filled.

Mr. Barnum sells goods not only in every State and Territory in the United States, but in Canada, Australia, Brazil, Europe, in fact, there is no considerable portion of the civilized world but what is more or less familiar with his work.

Mr. Barnum is proud of his second success and his course is a good illustration of the fact that in this country all obstacles and misfortunes are overcome by intelligent, diligent and patient work.

He has just issued an illustrated catalogue which will be mailed upon application. All correspondence should be directed to

E. T. BARNUM.
P. O. Box 86, Detroit, Mich.

TRAP-SEAL PROTECTION.

Letter from Mr. Putnam to the *Sanitary News*, comparing the "Trap-Vent" with the "Sanitas" system of plumbing, in reply to Mr. Honman:

Boston, Mass., November 23.

To the Editor:

Your correspondent, Mr. Honman, in reply to my letters on "Trap-Seal Protection," asserts that a simple S-trap, protected against siphonage by some form of automatic air-supply, is better than an antisiphon or seal-retaining trap on the ground of cleanliness.

Several important considerations affecting this question seem to have been overlooked by Mr. Honman, which appear to me to be sufficient to reverse his conclusions; and, as these considerations are founded on very careful experiments of mine, some of which have never as yet been published, I will avail myself of your invitation to contribute our experiences on the subject, to present them here.

They may be summarized as follows:

1. No automatic air-supply has ever been invented, nor probably ever will be, which will form a reliable protection against siphonage, although such a form of air-supply, as your correspondent recommends, seems to me to be much more reliable in many ways than the ordinary back-vent pipe.

The scouring properties of a trap are due not to the *absolute* size of its body, but to its *relative* size as compared with the discharge outlet of the fixture it serves.

I have found a common S-trap used under an ordinary small-outlet wash-basin, nearly filled with a jelly-like filth, through which the waste-water passage left was no larger than a man's little finger or than the free outlet of the basin, and not more than a tenth of the capacity of the trap and pipe when new.

There are no "*greatly enlarged cavities*" in a scientifically designed (the "Sanitas") seal-retaining trap. When such a trap is used under a fixture having an outlet as large as its waste-pipe, and the fixture is properly used, so as to fill these pipes "full bore," the scour will be sufficient to keep all parts of the trap clean. When such a trap fouls, the fault is in the fixture or in its usage, and not in the trap.

With improperly formed or used fixtures any trap will, and must, necessarily foul in time, and an S-trap is no more exempt from this law of nature than any other. Even perfectly straight and smooth pipes will foul under such circumstances.

The safe rule to avoid this trouble is *to construct every fixture on the principle of the flush-tank, and to use it as such*, and it is self-evident that no other practice will keep the waste passages clear.

2. Ordinary S-traps, recommended by your correspondent, are liable to lose their seals through other causes than siphonage, such as back-pressure and capillary action, against which the automatic air-supply forms no protection whatever; whereas, our seal-retaining trap is formed with reference to withstanding those adverse forces, and, properly set, it affords perfect security in these particulars.

3. The volume of water in an ordinary S-trap is too small, and the trap is not scientifically designed with a view to the perfect preservation of its seal against evaporation. The automatic air-supply is infinitely better than the back-venting system in this respect, inasmuch as it does not materially increase the evaporation of the water-seal; but the S-trap in the combination is at fault. In a well-designed seal-retaining trap all danger from evaporation is practically avoided.

4. Accepting, then, as evident (as we must) the fact that any pipe or any trap under improperly formed or used fixtures will foul in time, it becomes clear that the seal-retaining trap is safer than a vented S-trap, because even a partial clogging of the latter will close the mouth of the air-supply, and thereby at once destroy the entire value of the device without announcing it to the house-owner; whereas, a clogging of the former will simply retard the outflow of the waste-water, which will at once announce the obstruction and lead to its removal. In no case will such clogging destroy the ability of the trap to resist siphonage, since the relative proportions of the interior remain the same, and the very obstruction which prevented the escape of the waste-water also prevents siphonage and the escape of sewer-air. Practice has shown this theory to be true, after a test of five years.

It is now well known that the mouth of the ordinary back-vent pipe becomes quickly clogged by grease under kitchen and pantry-sinks, and this objection to back-venting is now considered so serious that many practical plumbers are urging its abandonment on this ground alone.

Now, the mouth of the automatic air-supply pipe is, in this respect, precisely the same, and is clogged in exactly the same manner; hence, it must be condemned on the same grounds.

Your correspondent objects to "enlarged cavities" in traps. *What is the mouth of the automatic air-vent pipe but exactly such a cavity?* It is worse than that, since it is a cavity placed precisely where it will be first and easiest filled with filth, and when filled it will never be washed out again since the scour does not reach it. Still worse than that, it is a cavity which, when once even partially filled, will cause the air-pipe to lose its original protecting power; and with this loss the value of the entire apparatus is destroyed.

Finally, worst of all, this loss of protecting power occurs without the slightest warning to the house-owner.

The mouth of the air-supply is, and must be, placed at the upper side of the trap or its outlet-pipe. Grease and those allied matters which cause obstructions in the waste passages by adhering to them are lighter than water, and must float, therefore, to the top. Hence, it is evidently exactly there that clogging must first take place, and cavities placed there, like the mouth of the air-supply pipe, must be the first to be clogged, and in practice it is found that this is the fact.

With our seal-retaining trap, on the contrary, no such dangerous cavities exist. The water-

passage is substantially of the same calibre throughout, and even should clogging through careless usage take place, it could do no harm, but would at once announce itself and be removed.

5. The automatic air-supply pipe, in combination with a trap, forms a somewhat expensive and delicate combination, involving quite a number of joints throughout its several parts, and the use of delicate moving parts and sensitive adjustments and also of free mercury. It would also seem as if water thrown up by back-pressure into the valve and mercury compartment might in time easily destroy its operation.

The seal-retaining trap, on the contrary, is simplicity itself, has no moving parts, and is of solid and durable construction throughout.

6. To recapitulate, then, the very arguments raised by your correspondent in favor of the S-trap, with automatic air-supply, are really the strongest against it, and are in favor of the unvented anti-siphon trap.

The former (the vented S-trap) is not secure against siphonage; has no resistance whatever in itself against back-pressure or capillary action; is not constructed with a view to resisting evaporation; has, as a necessary part of its construction, an "*enlarged cavity*" placed where it is most easily clogged by grease and filth, and where such clogging is fatal to its operation and extremely dangerous to the house-owner; and it is expensive, complicated and delicate in construction.

From all these objections our seal-retaining trap is free, and its practical trial for many years has amply demonstrated the truth of the statement. Respectfully yours,

J. F. PUTNAM.

CHANGE OF PARTNERSHIP.

THE partnership heretofore existing between the undersigned under the firm name of Haines, Jones & Cadbury, has this day been dissolved by mutual consent.

THOMAS J. JONES,
JOHN W. CADBURY,
JOEL CADBURY,
WILLIAM H. HAINES.

November 30, 1888.

HAVING purchased the plant of the late firm of Haines, Jones & Cadbury, we would call attention to our facilities for supplying all kinds of plumbers' and steam-fitters' supplies, and solicit a share of your future trade.

HAINES, JONES & CADBURY CO.,
1138 RIDGE AVENUE, PHILADELPHIA, PA.

SOME NEW SYRACUSE STRUCTURES.

THE scaffolding, which has encumbered the Everson and Lynch Blocks, on South Salina Street, has been removed, and two handsome buildings are presented to view. There is a certain similarity in the structures owing to the free use of pressed-brick and terra-cotta.

The Everson Block, which adjoins the Weiting Block, is from designs by Messrs. Baxter, Buell & Tabor, and is as near fireproof as it is possible to make it, being constructed solely of iron, stone, brick and terra-cotta, none of which have very good burning qualities. This building is seven stories high, and has a frontage on Salina Street of forty-four feet, and from cornice to sidewalk it is just 100 feet. The ground-floor will be taken up with a double store 40 x 137 feet, divided through the centre by nine massive iron columns. The second-story front will be finished for occupancy by a bank, and will be fitted with stone and steel vaults. The front of this building is very attractive, and is beyond question the most imposing structure on South Salina Street. The piers each side of the stores are of Carlisle brown sandstone, and the second and third stories are of the same material. Above the third floor the front is of iron, brick and terra-cotta. No wood is used, nothing but iron girders and pillars from cellar to roof. The chief attraction centres in the terra-cotta work, which is of very choice design. It shows what can be done with architectural terra-cotta, whether used in friezes, window-caps or coping. The latter is a work of art in itself, and the New York Architectural Terra-Cotta Company, of No. 38 Park Row, New York City, naturally feel proud of their work, as do the architects. The iron-work is from the Trenton, N. J., Iron-works, which is being erected under the supervision of James B. Cornell, of New York, while Messrs. O'Brien and Houlihan, of this city, have the contract for the mason-work. The Lynch Block adjoining, from designs by Architect Russell, shows a magnificent front, stone, pressed-brick and terra-cotta being the materials employed. There are some fine designs in the terra-cotta work, which is furnished by the same company as above mentioned. This building, which is being erected by Messrs. O'Brien and Houlihan, is six stories high, and reflects great credit upon its designer. These two blocks, artistically considered, are the handsomest structures on Salina Street.

The new Grand Opera-House Block is being rapidly pushed. There was a hitch over the employment of non-union masons by Messrs. Ryan & Rafferty, which was adjusted by Mr. Moore going ahead with the work himself. The plans and elevation for the block have been perfected by Architect Russell, and McElfatrick & Son, the New York theatrical architects, will attend to the plans for the opera-house proper. The block will be four stories high, with an additional mansard in the centre of the block. On the ground-floor there will be space for six stores, running from Genesee to Fayette Streets. The opera-house will be located on the second floor, as in the old building, and will be reached by a twenty-foot lobby from Genesee Street. The upper floors of the block fronting on Genesee Street, will be devoted to offices and halls, and every foot of space will be utilized. The building will be constructed of Trenton brick and terra-cotta, some of the latter showing some very fine carving. This work is also furnished by the New York Company. The style of architecture belongs to no particular school, and may be described as "modern." The general arrangement of the interior of the opera-house will differ very little from the old structure. It will be much more elaborate, and will be a model structure of its kind, with every precaution for safety and means of exit in case of fire. What it will cost to erect this new temple of amusement, Messrs. Moore and Lynch will know when they get through. It is intimated that it is contemplated to add another story to this structure, which would make it five stories, with mansard.—*Syracuse Real Estate Record, December 8, 1888.*

MAHOGANY.

IN our desire to extend our business in the sale of Mahogany it occurs to us that if more were known regarding this standard wood, its adoption and use would become much more general. We believe an impression exists that it is an expensive wood only to be indulged in by the few—this however is not the case.

The facilities for procuring Mahogany in its native country and the devices for reducing it into lumber have so improved, that its cost to-day compares favorably with some of our domestic hardwoods, notably Cherry.

We are prepared to supply Mahogany of the best texture and grain as low as fourteen to sixteen cents per foot on cars in New York—the grade known as "seconds" at seven to eight cents per foot—and a grade between the two at ten cents. In measuring these grades last mentioned allowance is made for faults, and there are very many places where for small work these grades prove very advantageous.

The cost of working Mahogany is certainly not greater than any of the domestic woods—computing then for any given work, this difference in price of the raw material, the cost of Mahogany over the domestic hardwoods will be found to be small.

It is universally acknowledged that Mahogany warps less, stands better, and is in every way more reliable than any other wood known: it is the only wood that grows more beautiful with age, all other woods grow dull and deteriorate in appearance. Mahogany has been called the "king of woods," and it imparts to an interior, a tone and richness conceded by all. Will not therefore the intrinsic value of a private residence or a public building finished in Mahogany warrant the use of this wood at a greater difference in cost than we have here set forth?

Inasmuch as there appears to be a vast deal of misinformation regarding Mahogany, we are led to place before you the actual facts. We are sometimes met with the assertion that there is now no Mahogany, that it is all "Baywood." As well might one argue that there is now no Black Walnut from the fact that it is no longer supplied (to but a small extent) from Ohio and Indiana, but largely from the Indian Territory. Thirty years ago Mahogany was commercially designated as "St. Domingo" (from the Island of St. Domingo) and "Baywood" or "Bay Mahogany" (from the vicinity of the Bay of Honduras in Central America). The Central American wood was rightly condemned as being too soft, of light weight, straight-grained, and characterless: in later years it has ceased coming to this market, but one cargo having arrived at the port of New York (now the largest Mahogany market in the world) in six years. St. Domingo Mahogany likewise exists, we may say, in name only. The original growth of the Island of St. Domingo has been long since utilized, and the importation of small lots at exceedingly long intervals are only of the small and stunted second growth, crooked, stained and defective, only individual logs of good size and quality are now and then to be secured. The markets of the world are now therefore principally supplied from Mexico. The Island of Cuba furnishes considerable quantities of a smaller size (more especially valuable for small work) which is hard and of good texture; but the great bulk of the Mahogany used in later years is supplied from the forests of Mexico. This great area of country however produces not only our largest and most beautiful grades of Mahogany, but also some of the softer and less desirable grades, somewhat resembling the Baywood or Honduras Mahogany of olden time, though still better.

This we regard as an important fact to be noted by architects and others interested in the use of Mahogany, for here arises the

difference in opinion on our Mexican Mahogany of the present day, some claiming it is soft and unlike genuine Mahogany, and others that it is hard and beautiful in texture. It is *both*, as we have explained. Let the architect or householder specify Frontera Mexican Mahogany or similar, and if the specifications are followed the result will be all that can be desired. Frontera is the shipping point for the better grades of Mexican Mahogany.

In the erection of buildings of all classes, there is in general a steady advance toward improvement. In recommending the use of Mahogany we believe the simple statement of facts is sufficient to warrant its adoption, and architect and client will derive in its use a satisfaction far outweighing the small advance in cost. We therefore feel that we are warranted in calling the attention of architects and builders to this subject, and asking their influence and co-operation to the end indicated. We shall take great pleasure in giving attention to any correspondence, and in giving any further information in our power.

W. E. UPTEGROVE & BRO.,
457 East Tenth Street, New York, N. Y.

NOTES.

The sales of Babcock & Wilcox boilers during October and November, 1888, were as follows: Chicago Sugar Refining Co., Chicago, Ill., fourth order, 1,088 horse-power; Brooklyn Sugar Refining Co., Brooklyn, N. Y., fifth order, 488 horse-power; Westinghouse Brake Co., Wilmerding, Pa., third order, 480 horse-power; Aitken, Mitchell & Co., Govan, Glasgow, Scotland, 110 horse-power; Société Générale des Monteurs de Boîtes d'Or, Besançon, France, 30 horse-power; James Simpson & Co., Pimlico, London, sixth order, 414 horse-power; James Miller & Co., Melbourne, Australia, 312 horse-power; R. & J. Salmond, Aberdeen, Scotland, 40 horse-power; A. Verastegui, Havana, Cuba, 300 horse-power; Singer Mfg. Co., Kilbowie, Scotland, eighth order, 93 horse-power; N. K. Fairbanks & Co., St. Louis, Mo., 140 horse-power; John Collins, Denny, Scotland, fifth order, 240 horse-power; Brazilian Extract of Meat & Hides Factory, Ltd., Paredas, Porte Alegre, Brazil, 124 horse-power; Schwartzkopff & Co., Berlin, Germany, 82 horse-power; Kansas City Electric Light Co., Kansas City, Mo., second order, 276 horse-power; Central Railroad of New Jersey, Jersey City Station, 368 horse-power; Girard Estate, Philadelphia, Pa., fifth order, 122 horse-power; Summerlee & Mossend Iron & Steel Co., Mossend, Scotland, 700 horse-power; James Simpson & Co., Pimlico, London, seventh order, 124 horse-power; Maitland, Phelps & Co., New York City, for Luz Electricella, Oxaca, Mexico, eighth order, 61 horse-power; Edison Electric Illuminating Co., Paterson, N. J., second order, 250 horse-power; Calvart & Co., Gothenberg, Sweden, 124 horse-power; Sharp & Kent, London, England, 194 horse-power; C. Tattersall, Manchester, England, 75 horse-power; Edison Machine Works, Schenectady, N. Y., fourth order, 146 horse-power; Devoux Freres & Co., Adrimont, Verviers, Belgium, 75 horse-power; R. E. Crompton & Co., Chelmsford, England, 165 horse-power; Anthony Shaw, Son & Pamphilon, Burslom, England, 186 horse-power; Gomez & Pearsall, New York City, for export, 73 horse-power; Docastro & Donner Sugar Refining Co., Brooklyn, N. Y., eighth order, 385 horse-power; Beau & Bertrand Faillet, Paris, France, 120 horse-power; Alexander B. Bary, Moscow, Russia, nineteenth order, 73 horse-power; Ing'o Jesus Maria, on Sta. Ana, Cuba, 150 horse-power; Berliner Maschinenbau Action, Gesellschaft, Berlin, 122 horse-power; Prentice Brothers, Stowmarket, Eng., 105 horse-power; Agar Cross & Co., Glasgow, Scotland, 51 horse-power; American Brake Co., St. Louis, Mo., 125 horse-power; Westinghouse Electric Co., Pittsburgh, Pa., 328 horse-power; Anglo-American Brush Electric Light Corporation, Ltd., London, England, fifth order, 84 horse-power; Anglo-American Brush Electric Lt. Corporation, Ltd., London, England, sixth order, 82 horse-power; Joaquin Arango, Rio de Janeiro, Brazil, 35 horse-power; Jonathan Ring & Son, Philadelphia, Pa., second order, 104 horse-power; Charles McNeil, Jr., Glasgow, Scotland, 126 horse-power; M. M. Musser & Fils, St. Etienne, Loire, France, 45 horse-power; Chavanne Renn & Co., St. Chamond, France, 248 horse-power; Charles Schlaeber, Paris, France, 20 horse-power; Alexander B. Bary, Moscow, Russia, twentieth order, 104 horse-power; William Beardmore & Co., Parkhead, Glasgow, Scotland, 140 horse-power; Consolidated Electric Light Co., New York City, second order, 250 horse-power; making a total of 9442 horse-power.

The Whittier Machine Company have recently constructed for the United States Treasury Department at Washington, D. C., an hydraulic freight elevator, operated by their Pressure Tank System; for Mr. John H Clark of Amesbury, Mass., one hydraulic freight elevator; for the Continental Bank Building, Boston, a steam elevator for their passenger service; for Dr. Baker's house, No. 22 Mount Vernon Street, Boston, an hydraulic passenger elevator; and for the Coy Paper Company of West Claremont, N. H., a horizontal steel boiler, five feet in diameter.

The manner in which Messrs. Dexter Bros., propose to illustrate their advertisement will make it worth while to look at it each week.

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The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Tichnor & Company, Boston, Mass. No. 684.

February 2, 1889.

Entered at the Post-Office at Boston as second-class matter.

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WITH this number the *American Architect* opens a new department, which it is hoped will prove very useful to its readers. For a long time the editors have had in mind the desirability of maintaining a department like that which forms an important portion of the French technical journals, in which questions involving legal points should be answered, and, if of general interest, discussed at some length by a thoroughly competent lawyer. Their correspondence with their subscribers, both privately and through the columns of their journal, has shown them not only how valuable to architects and builders timely advice of this sort may often be, but how much more valuable it is if it is always ready, and is to be implicitly relied upon. The persons who can furnish such advice are by no means numerous, even in the legal profession, and the editors consider themselves fortunate in having secured the services of a lawyer not only very thoroughly trained, but experienced to an unusual degree in building cases, and familiarized with the technicalities of construction by many building operations carried on under his care, either on his own account or as trustee for others. His own introductory remarks, to be found in another column, will best indicate the character of the work which he is to do in the interest of the subscribers to the *American Architect*, and the editors need only add that they have reason to believe that the work will be well done, and that those who consult the department will receive advice which may be depended upon as having been carefully weighed, and based upon accurate knowledge of the subject.

A RESOLUTION has been introduced in the New York Legislature, directing the Supervising Commissioners of the Capitol "to make a thorough examination of the present condition of the Capitol building; to ascertain the kind and quality of materials and labor that will be required to complete the same, internally and externally, according to the plans and specifications therefor already adopted and now in force; and to make as full, accurate and detailed an estimate of the cost of such material and labor as they may be able to prepare." They are also empowered "to suggest modifications or changes in the plans for the building, or for any part thereof, making a detailed statement," with estimates of cost, in regard to any such modification, and are directed to "express their opinion as to the length of time that will probably be required to complete the building according to the plans which they may recommend," and to report in full on all these points "on or before the fifth day of February next." On the twenty-third of January the resolution was still pending in the Senate, and, if it passes there, it must go to the Assembly for concurrence, so that, supposing other business to be suspended, and the resolution pushed through with all possible expedition, the Commissioners will have, at the utmost, twelve days in which to "make a thorough examination of the building," concoct "modifications or changes in the plans," and prepare detailed estimates, not only of the cost of these changes, but of all the work remaining to be done under the existing plans and specifications. It ought to be unnecessary to say that any plans or estimates prepared under such conditions would be perfectly useless and ridiculous, but as the New York Legislature has now spent eighteen millions of dollars, in tinkering its building, year after year, on just this system, it would seem that there are some people who still need to have the lesson impressed on their minds that to employ four independent architects on the most important structure in the State, to accept, without expert advice, designs from each, which, after they have been half carried out, the others are employed to demolish and replace by something else; to leave all the architects in the dark as to what each is expected to do, and, after each has done a great deal of work which turns out to be in his colleagues' province, to appoint some one else to execute a miscellaneous mangling of the entire assortment of designs; and finally, to disgust all the architects by slubby treatment, and, finding their zeal chilled, to seek a substitute for it in a succession of commissions of all sorts, is not the way to secure either rapidity or economy in building, whatever other objects may be attained.

IT would hardly be credible that the Albany Capitol, even in its present unfinished condition, is by far the most costly building of modern times, if we had not the official statement of the expenses. The Capitol at Washington, from 1793, when its corner-stone was laid, up to 1878, had cost, including all expenses of repairs, supervision, furnishing, alterations and minor items, less than thirteen millions, and in eighty-five years of constant use all the furniture, and much of the structural part, must have been several times replaced. The Patent Office has now cost nearly as much, but this, we suppose, includes rebuilding after the disastrous fire; and the Treasury, a more expensive design than the Capitol, has cost seven millions. On the other side of the ocean, the architectural wonder of the century is the Palace of Justice at Brussels, the largest known building in the world, which covers two hundred and seventy thousand square feet, or nearly twice the area of the Capitol at Washington, with a mass of sculptured and polished marble, surmounted by a marble tower four hundred feet high. The palace stands on the edge of a precipice, so that the foundations were enormously expensive, yet the whole was finished complete for ten million dollars. Undoubtedly, building is somewhat cheaper in Belgium than in Albany, but the real reason why the people of Brussels got at least four times as much as those of Albany for about half the money is that they had sense enough to select a design carefully, to employ its author honorably, to pay him properly for his services, and to let him carry out his plan without blundering interference, and without upsetting his calculations, and those of the contractors, every few months by neglecting to make appropriations, or by letting loose upon the work a new set of commissioners with power to change everything at their own sweet will. Whenever the New York Capitol is finished, it will be inaugurated, not with the rejoicings of King and people, but with the execrations of nearly every one who has ever had anything to do with it, including the tax-payers. The various architects, who have worked harder, and brought more knowledge to their task, than any one else, have suffered most. The late Mr. Richardson, to whom, we may well say, the Capitol owes most of its fame, did some of his best work for it after his tiny salary had been cut down, by a vote of the Legislature, to a sum which would not much more than pay for the paper and ink used for the drawings. He nearly decided, as he told us at the time, to resign, but other work came in, from the proceeds of which he could pay out of his own pocket the draughtsmen who were helping him to endow the State of New York with a structure to which Mr. Freeman accords the highest praise that he bestows on any modern building. We can wish for the public and the profession, and for architecture in this country, nothing better than that such transactions may for the future be impossible in connection with public buildings. There is good reason to hope that our architects have nearly done with submitting their work, and their fortunes, to the whims of persons

who know, and care, nothing about their art, and when they have fully made up their minds in this respect, they will be in a position to demand such treatment as their brethren abroad receive in return for services no more valuable than their own.

A DECISION has just been rendered in Ohio which will, we hope, serve to encourage in the managers of trades' unions a little more decency than they have hitherto shown in regard to the means which they employ for coercing people against whom they have a grudge. A firm of contractors in Cincinnati happened in some way to offend the Bricklayers' Union. This is by no means a difficult thing to do with most trades' associations, as the income and influence of the leaders is dependent on the frequency and ferocity of the quarrels between masters and men which they foment, and, as usual, a trifling workshop misunderstanding was nursed into a struggle which was carried on for ten months, with the help of all the cowardly weapons that the modern "Knights" delight in. The first step was to induce non-union men to leave the firm's employment, and to threaten those with vengeance who should take their places. This was followed by appeals to persons who had contracts with the firm to break them, and to dealers to refuse to sell materials to them. Notwithstanding all these malicious proceedings, the firm prospered, and the Union managers then had the usual circular printed and distributed broadcast, informing the public that the firm employed unskilled men, and did inferior work as contractors. At this point the firm thought the matter had gone far enough, and appealed to the law. By the time it had heard the testimony, the jury was unanimous in favor of a verdict for the plaintiffs; the only question that it considered was the amount of damages that should be awarded. Naturally, the actual loss that a person or a firm suffers from such foul attacks is, in most cases, incapable of exact estimate. The law does not allow the jury to take a handsome sum from the offender and confer it upon the victim, as a consolation for the injury done to his feelings; it can only award such a sum as will reimburse him for his actual loss of business or reputation; and it is not surprising that one juryman thought that seven hundred dollars would pay for all the actual harm that the Union was able to inflict, while another thought that fifteen thousand dollars was not too much to award. Finally, these diverse views were harmonized, and a verdict was brought in for thirty-seven hundred dollars, twenty-seven hundred of which the jury thought was a fair estimate of the pecuniary loss caused by the publication of the circular, while it considered that one thousand dollars would pay for the damage due to the previous proceedings. The next thing will be to collect the money. Like private persons, unions which have no property can damage other people's business as much as they like, secure in the knowledge that no one can make them suffer from their actions, and we fear that after execution had been issued the financial condition of a good many unions would be found less flourishing than their treasurers' reports indicated. Perhaps a good way would be to enact a statute, under which, in the case of such wanton mischief as this, the officers of the Union, in default of money to make good the damage they had caused, might be sold as slaves for a limited period, and the proceeds of the sale applied to satisfy the judgment. This method of disposing of the cases would have two advantages. Not only would justice be secured in favor of the person aggrieved, but the union officers would have an opportunity for practising useful industry, such as they seem to find it difficult to meet with under ordinary circumstances.

THE people who live near oil-wells and salt-works ought to take warning from the fate of some villages in England, in the county of Cheshire. According to the *Builder*, the property-owners in the town of Northwich have petitioned the Government to send a Royal Commission to see the damage which has resulted from the working of the salt-mines in the vicinity. The surrounding district, like that about Syracuse, in New York State, is filled with wells, from which are pumped enormous quantities of brine, containing about twenty-five per cent of salt, which is recovered by evaporation. About one million tons of salt are thus manufactured in Cheshire every year, and sent away to all parts of the world. The removal of all this matter from the subsoil causes settlements, which have been more serious and extensive this year than ever before. In the region about the village of Winsford more than one hundred acres of land have sunk, and are now covered with water to a depth of twenty feet. The Winsford market has sunk thirty feet, and one of the houses in the village has gone down so far that only the top of the roof is now visible above ground. Throughout the entire region, streets, houses, bridges, gas and water pipes are moving so rapidly that continual rebuilding and repairing is necessary. The memorial represents that the owners of the salt-wells pump out and sell the salt on which the houses of the citizens rest, and keep the money; while the citizens themselves not only have to spend large sums in rebuilding their own dwellings, but are taxed to repair the highways and other public property; and it prays that an impost may be laid on the salt trade sufficient to pay the damage caused by its prosecution.

THE *British Architect* gives some figures from the reports of the public gas companies in England which are interesting. In many cases there the towns own the gas-works, charge fair rates, and appropriate the profits to public improvements; but there is certainly a surprising difference, either in the circumstances under which the gas is distributed, or the economy with which the manufacture is carried on, which shows itself in a great variation in the profits derived from the business. The lowest price charged for gas in 1887 was in Plymouth, a small city in Devonshire, where it was sold for forty-two cents per thousand feet, and at this price the year's business earned a dividend of thirteen and one-quarter per cent on the capital invested. The highest price charged was a dollar and eighty cents a thousand cubic feet. This was at Walton-on-the-Naze, and even at this rate no dividend was earned.

THE Royal Academy of Science of Turin announces that the prize founded by the will of Dr. Cesare Alessandro Bressa, amounting to twenty-four hundred dollars, and open to authors and inventors of all nations, will be awarded at the end of December, 1890, to that competitor who shall have made the most important and useful discovery, or published the most valuable work in physical or experimental science, natural history, mathematics, chemistry, physiology, or pathology, or in geology, history, geography, or statistics. The prize will be awarded by the Academy of Turin, and all its members, resident or non-resident, are excluded from the competition.

VISITORS to Europe this summer can entertain themselves in London by visiting the Spanish Exhibition, which is to open there in April. The President of the Exhibition Company is the Duke of Wellington, who ranks as a Spanish noble, and the affair promises to be interesting. Among other things, a herd of Andalusian bulls is to be imported, together with a large number of matadors and other persons, and bull-fights will be shown daily. It is said that these will be free from the cruelty usually accompanying them, so we suppose the bulls will have their horns cut off. A special point will be made of the costumes of the various provinces, and natives of Cordova, Salamanca, Granada and the Basque provinces will be seen in their native villages, engaged in the sports or occupations peculiar to them. In manufactures Spain is not particularly rich, but Cordova leather, Toledo steel and damascened work, laces and cigars, will be exhibited.

MR. SANDERS, of St. Petersburg, has revived, in a modified form, the old Liernur pneumatic system of sewerage, with improvements that seem to make it practically available in many cases where the other is not. Under the Liernur system the entrance of water into the sewers is avoided as much as possible, and even Dutch cleanliness does not suffice to keep the house-drains of Amsterdam, exhausted periodically by suction, but not flushed, sweet enough for American taste; but the Sanders system encourages the use of water, disposing of the matters with which it deals by means of ejectors, which will transfer solid substances to the outfall, but work more freely with liquids. It is probable that when a severe epidemic of diphtheria shall arouse the public again to the importance of sewerage in our inland towns, disposal by irrigation will be generally preferred. In this case there will be many improvements needed in the methods of conveying the sewage to the irrigated fields. The pumps, settling tanks and stand-pipes which have hitherto been employed are cumbrous and expensive, and a good system of ejectors, buried far enough underground to be out of reach of frost, and operated from a central station, might be less troublesome, as well as more efficient, than tanks and stand-pipes.

BUILDERS' HARDWARE.[1]—XVII.

LOCKS.

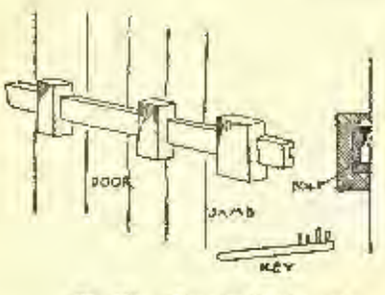


Fig. 277a. Egyptian Wooden Lock.

ANY one who should visit the mediæval museums of Europe, and should chance to see among the curiosities of iron-work some of the elaborately wrought and apparently intricate locks of the fourteenth, fifteenth and sixteenth centuries, would hardly think of comparing those unwieldly and cumbersome devices with the locks that are turned out in such quantities by our best modern manufactories. And yet, if the older contrivances are examined attentively it will be seen that the difference between the old and the new is one of finish and delicacy, rather than of idea or mechanism; and that, with the exception of a few noteworthy inventions for obtaining a greater security against picking by an ordinary thief, the locks of to-day are exactly the same, in principle and arrangement, as those which were made centuries ago. Indeed, it is rather strange that with all the inventions which have been made during the nineteenth century and especially within the present generation, and notwithstanding the inventive genius which American industry has brought to bear upon the subject, the Yale system should be, after all, very nearly the only invention of practical utility which is a direct departure from the older methods of lock making. Probably a large proportion of the readers of this paper can distinctly remember the time when pin locks were almost unheard of. It might be said in explanation of the seeming fruitlessness of mechanical research upon this subject, that there was really very little that could be discovered or improved upon, as the real principle of a lock is too simple and too definite in its nature, not to have been thoroughly appreciated and exhausted long ago; but the same could have been said before Linus Yale brought his Yankee wit to work upon the subject, and it would be impossible at present to foretell what discoveries may be made or what radical changes brought about in the appliances for locking our doors. Possibly our descendants may some day wonder at the locks of the nineteenth century, even as we wonder at the cumbersome pieces of mechanism and the ponderous keys of our great grandfathers. At any rate, it will not do to claim that our locks are perfect, or that the record of progress is entirely closed. A very few years ago the Yale lock was pronounced to be complete; but some very radical improvements have been made in it since then, and the opponents of the system claim it has yet many defects both in construction and idea. So it would not be strange if our best locks should one day become obsolete.

But if the progress which has been made in the essential, mechanical principles of lock manufacture is small, the improvements in finish and the reduction in the cost of the locks have been marvelous. Less than a century ago, locks were made entirely by hand, and very crude affairs they were, too, costing a great many times the price of a better article of to-day. At present, good, well-made, well-planned locks can be had at prices varying from twenty-five cents to five dollars, suited to all needs and all conditions; while the amount of real security afforded is of a much more tangible nature. And with the improvements in niceness and delicacy of arrangement, it has been possible to affect a change in the style and weight of the keys which the present generation can only faintly appreciate. The old-fashioned keys were heavy, cumbersome, and so large that no one ever thought of carrying them about the person. Now they are made so small that the keys for an entire house can be carried in one's vest pocket. Formerly the strength of a lock was judged by its weight, and it was considered essential to have heavy bolts or levers, and strong springs, requiring considerable force to operate; while now, all the parts are so well adjusted and so light, that a touch is sufficient to put the mechanism in operation.

The fundamental principles forming the basis of all locking constructions, include a bolt which is moved by the direct action of the key, while secondary bolts or levers drop into such positions that the lock bolt cannot be forced back except by breaking some portion of the mechanism. The secondary bolt is usually termed a lever, and either acts by gravity or by the aid of a spring—usually by both. The key is so made as to first raise the levers, and then to shoot the bolt by a single turn of the hand. These principles have governed the manufacture of locks since the days of Adam, and apply equally to the ponderous locks of the Middle Ages and to the corrugated-key locks of the Yale & Towne Manufacturing Company. Complications have been added to the construction of locks in the shape of multiple levers, requiring nicely fitted keys, or fancy wards which would allow none but the right key to enter; and there have been special forms devised for bank uses, working by combinations of letters, by dials, or by clock-work; but in the locks used about an ordinary house, the principle is always the same—that of a key simultaneously lifting one or more levers and moving a bolt.

In order to clearly illustrate the antiquity of the principles upon which modern locks are constructed, it may be of interest in this connection to refer to a few of the older forms. A rude style of lock which has been used in Eastern countries for ages, no one can say how long, but certainly for over two thousand years, is approximately shown by Figure 277*a*. All the parts are of wood, including the key. The bolt is channelled on the inner edge, and slides through heavy wooden staples in which are arranged a number of pegs, of varying lengths, fitting into corresponding holes bored through the top of the bolt. The key consists of a flat piece of wood somewhat smaller than the channel which is cut in the bolt, and in use, is inserted lengthwise of the bolt. On the end of the key are pins spaced to correspond with the pegs in the staple. It is evident that while the pegs are caught in the bolt itself and in the staple, the bolt cannot be moved; but when the key is inserted, the pins will be directly beneath the holes in the upper part of the bolt, and by raising the key, the pins will lift the pegs just enough to clear the joint between the bolt and the staple, and the bolt can then be moved at will. In this lock, the action of the key is almost exactly the same as in the Yale lock; namely, to lift a series of pins of unequal lengths so as to bring the bottom of each on the same line, though the Yale key has other functions, as will be noted later.

Figure 278 shows a key which was dug up in Pompeii. It was evidently intended to operate a warded lock, a style which was in almost universal use up to thirty years ago. Figure 279 illustrates a fine old Elizabethan lock. This could be described as a fully-developed lever-lock, the springs on the levers being arranged in exactly the same manner as the locks which are sold over the counter to-day. Stripped of all the fancy cutting and misleading wards which have nothing to do with the efficiency of the lock, it will be seen that this is really a very simple contrivance, though quite complicated in appearance.

Fig. 278. Key from Pompeii.

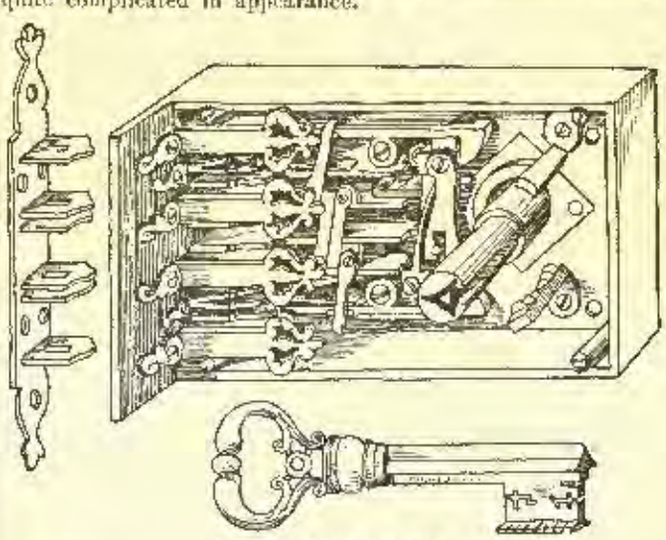


Fig. 279. Elizabethan Lock.

The number of antiquated examples might be multiplied indefinitely, but the foregoing will suffice for the purpose, as they may be taken as types of the three most markedly different arrangements for adding to the security of a lock, namely with wards, with pins or with spring-levers.

[1] Continued from page 8, No. 630.

The various parts of a lock will need some definition and explanation, in order to prevent any ambiguity in the terms. Figure 280 shows the general shape of the ordinary key, in which *A* is called the bow; *B*, the shank, and *C*, the bit. The difference between the keys of to-day and those of two or three generations ago has been already alluded to. Many of the hand-made locks are still provided with the old-fashioned, heavy brass keys, but the "Yale" locks have prejudiced people against anything but a flat key, and nearly all manufacturers use them in one form or another. A few lock-makers have keys which are arranged to fold up like a knife, to be used in connection with rim-locks, or with locks requiring a very long key, but generally the key is of steel, nickel-plated, with a flat shank and a thin bit. When the cuts on the bit are on the side or edge, as shown by the cut, it indicates a tumbler or lever-lock, while cuts on the top or bottom show that the lock is fitted with wards. Many of the old keys preserved in museums are made with very elaborate bits, cut in curious and intricate patterns. In some instances the cuts correspond to equally intricate wardings in the lock, but generally they are purely fanciful. When the shank of the key is tubular, it indicates a lock which can be operated from one side only, such as those used for drawers, etc. All keys for door-locks now have solid shanks.

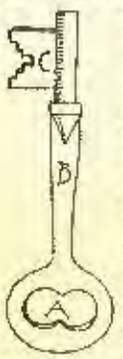


Fig. 280. Key.

The bolt which secures the lock is generally made quite heavy where it projects beyond the face-plate, but is thinned down inside the lock so as to be as light as possible, and to give space for the levers. The talon, *A*, Figure 281, is the notch in the under side of the bolt in which the key works. The post, *B*, is the part which catches in the levers, preventing the bolt from being forced. Guide-posts on the case of the lock fit in the slots, *C*, one of the same posts often serving as a pivot for the levers.

Fig. 281. Bolt.

The most primitive form of lock would be one consisting simply of a bolt, which is shot back and forth by the key. But as any other key or even a wire would answer equally well, some obstacle must be interposed to prevent picking. This is done by combining with the bolt a series of levers or tumblers which permit only the proper key to be used. The two terms are used at present synonymously. Figure 282 illustrates a typical lever. There are from one to five levers in an ordinary lock, and they are usually placed one over the other, pivoted over the guiding-post, and the bolt-post is so arranged as to fit through one of the cuts, *A*, when the bolt is thrown back, and through *B* when thrown out. The connecting gatings, *C*, are cut at different heights, so that the levers must be lifted unequally in order to permit the bolt to move. When the key is turned in the lock, the bits, which are cut to match the levers, bear against the bellies, *D*, lifting the levers simultaneously until the gatings are exactly on a line with each other. The key then catches in the talon of the bolt, the bolt-post passes through the gatings, and the levers drop as the key turns, catching behind the bolt-post and effectually preventing the bolt from being forced back. This is, generally speaking, the function of all lock-levers, though there are many variations from the form illustrated.

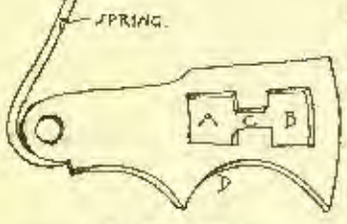


Fig. 282. Lever.

The levers, of course, slide one over the other, and in common locks they are laid closely together. In the best of hand-made work, however, and in a few of the machine-made locks, the levers are separated, either by side-wards cast onto the thickness of the lever, or by intermediate strips of brass which bear on each other and on the levers only at certain points, thus reducing greatly the friction between the parts.

A somewhat different form has been much used in English locks, which is shown by Figure 283. In this case the levers are beneath the bolt. On each is a post which works in slots and through gatings cut through the bolt. Price, in his "*Treatise on Locks*,"[1] which is a very valuable and interesting work on the subject, as it was understood up to 1860, makes

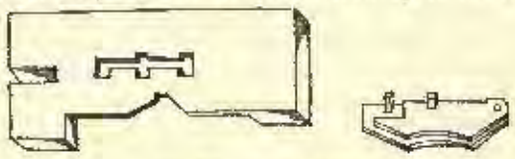


Fig. 283. English Lever.

the distinction between levers and tumblers, applying the latter term to the device shown by Figure 283, and the former to that illustrated by Figure 282. His distinction seems to be a fair one, though seldom made in this country, where what he calls tumblers are little used.

A little reflection will cause one to comprehend the number of changes possible in a lever-lock. The levers may be transposed, and within certain limits the heights of the gatings may be varied, so that with six levers there can be as many as 7,776,000 changes, no two of which can be operated by the same key. Simple transposition, without any variation in the heights of the gatings, will give 720 changes.

A device has been used in some makes of locks, intended not only to increase the difficulty of picking but also to show if the lock has been tampered with. It consists of a spring so arranged that when one of the levers is lifted too high, as would naturally be done by any one attempting to pick the lock, it is caught and held in such a position that the bolt-post cannot possibly pass through the gatings. The spring is released by using the right key and turning the bolt out more, but no key can unlock the mechanism until the detector spring is released. This is a very ingenious arrangement, and at one time was considered absolutely burglar-proof, though it is now very seldom met with in the market.[2]

The wards of a lock are fixed obstructions which are attached to the inside of the lock-case, so arranged that none but the proper key can pass and reach the levers. Formerly the confidence in warded locks was so great that levers and tumblers was used very little, but that feeling has entirely passed away. Modern locksmiths use wards very sparingly, and limit themselves to small shoulders or ridges, cast on the inside of the upper and lower case-plates, which require corresponding cuts on the upper and lower edge of the key-bit. They do not add in the least to the burglar-proof qualities of a lock. At one time, however, locks were constructed with very elaborate wardings. Figure 284 illustrates the wards of a French lock about one hundred and fifty years old. The wards consist of two thin plates, one each side of the key-hole, with a series of ridges forming a semicircle on each, the ridges being star-shaped in section. The key-bit is cut out with a star pattern which has to exactly fit the wardings. This is one of the simpler forms which the ingenuity of French locksmiths at one time delighted in, and though seemingly proof against intrusion, can be opened with very little trouble, by a judicious use of a few stout wires.

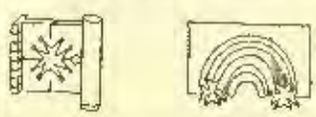


Fig. 284. Wards of an old French Lock.

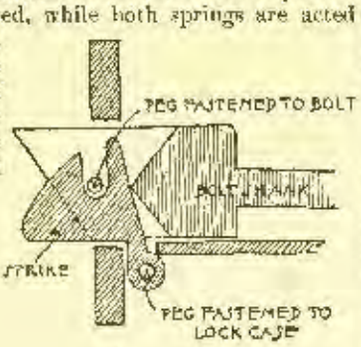
There is a great difference in the quality and arrangement of springs used in connection with a lock. In regard to material, the best is, undoubtedly, phosphor-bronze; but springs of this material require to be so large in order to have the desired stiffness, that their use is not always practicable, especially as they can be used to advantage only in the shape of flat-bands. The springs which hold the levers in place against the bolt-post are usually made of round steel or brass wire, and are attached directly to the heel of the lever, as shown by Figure 282. A separate spring is necessary for each lever. It is sometimes desirable to attach the spring to a secondary lever acting directly on the top of the main lever, Figure 285, as in a case where the levers move up and down in the lock instead of being pivoted together. With such an arrangement the edge of the secondary lever should be grooved so as to fit over the top of the primary lever, thus obviating

[1] This work is entirely out of print, but can be found in most of the large public libraries. It is complete and thoroughly illustrated.

[2] The detector-spring was an important feature of the celebrated "Chubbs" (English) locks.

any difficulty of the levers slipping by each other, or of the wrong springs acting on the levers.

The latch is a feature of the modern lock which our ancestors did not enjoy. Except in the case of store-doors, all door-locks are now made with some form of spring-latch. There are three distinct kinds of latches commonly used, the simple spring-latch, anti-friction latch and front-door latch. The cheapest form of ordinary spring-latch consists of a bevelled head, projecting from the face-plate of the lock, with a shank inside the lock, about which is coiled a strong spiral spring, keeping the latch pressed out. The inner end of the latch-shank is forked and hooks under each side of what is termed the follow, through which passes the spindle of the door-knob. Turning the knob either way draws back the latch. The objection to this arrangement is that while only a very slight spring is really necessary to keep the latch in position, a pretty strong spring is required so that the knob shall not turn too easily; otherwise, every time the door-knobs were touched the latch would be opened. Consequently in the better class of work a door-latch is usually fitted with two springs, one of which is operated when the latch is pushed back by the door being closed, while both springs are acted upon when the knob is turned. In this way the requisite resistance can be obtained for the knob, and, at the same time, the latch will close easily. A latch so arranged



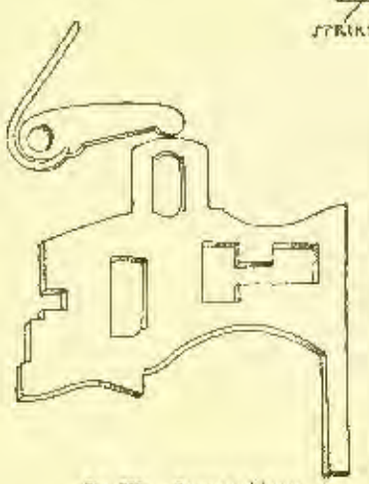


Fig. 285. Compound Lever.

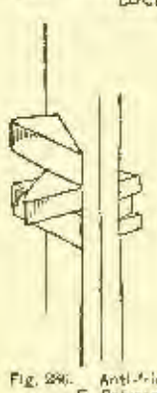


Fig. 286. Anti-friction Strike, E. Robinson.

is termed an easy spring-latch. There are several methods of attaching the two springs. Ordinarily, spiral brass springs are employed. Hopkins & Dickinson and, we believe, a few others, are able to introduce into their locks springs made of phosphor-bronze, which, it is claimed, will keep its elasticity much longer than steel or brass. The different methods by which the springs are attached and the knob operated will be made clear when the various makes of locks are described, later on.

The ordinary form of latch is made with a V-shaped bevel, the long side of the bevel striking against the jam-plate. Enoch Robinson, of Boston, was, it is believed, the first to patent an anti-friction strike, as it is called. Figure 286 illustrates the construction of his device, which is incorporated into all of the locks which he makes. It is simply an application of the principle of the old bell-lever crank. The action of the anti-friction strike is to raise the latch-bolt from the bed of the lock and carry it back without friction on the sides. Actual tests have been made proving that it requires less force, acting directly on the side of the anti-friction strike, to force the lever back, than is required to push back the latch by straight pressure against the apex of the bevel.

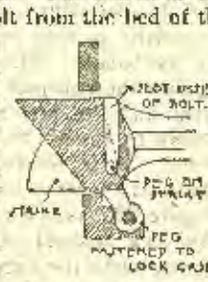


Fig. 287. Anti-friction Strike.

Figure 287 shows a form of anti-friction strike used by several other manufacturers. There is no difference in principle between this and the "Robinson" make, though the appearance is a little different, the "Robinson" strike being in the centre of the bolt, while the others are on one side, also in "Robinson's" strike the pin is on the latch and the slot in the strike, while in the other anti-friction strike they are exactly the reverse. Figure 288 shows

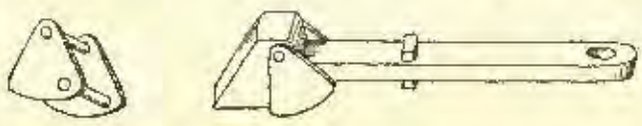


Fig. 288. Anti-friction Rocker Strike.

a form which is made by a few manufacturers, being listed in the catalogue of both J. B. Johnston and the Nashua Lock Company. It consists simply of a steel rocker attached by swivel pins to the bolt, the lower pin passing underneath the shank of the bolt. When the door is closed the latch, instead of moving straight back, swings on the lower edge of the rocker, being lifted from the lock-frame, and thus reducing the friction. The gain by this device is, of course, less than by the others previously described. Yet another form of so-called anti-friction strike is made. Figure 289 shows the pattern adopted by Hall, of Boston, for his spring-latches. It consists, essentially, of an adaptation of the well-known car-door latch, the latch-strike being hinged at the base and attached by a loose-pin to the latch-shank at the top, while the face of the latch-strike is curved slightly. This device makes really a very efficient anti-friction strike. The only objection to it is that the wide plate necessitated by it cuts the door a great deal, and many persons do not like it on that account.

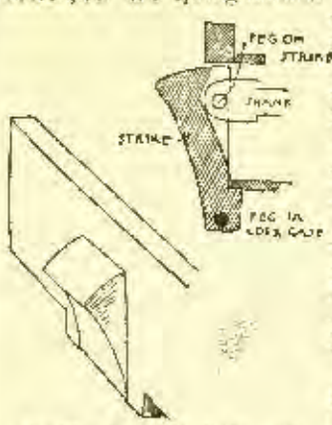


Fig. 289. Anti-friction Strike, Hall.

The custom in regard to latches varies in New York and Boston. In New York the outside knob is generally fixed firmly so as not to move at all, while in Boston the knobs are arranged with a swivel spindle permitting either to be turned without acting upon the other, and the mechanism inside of the lock is so devised that by pushing a button or a slide the outer knob can be held fast. In cheaper forms of front-door locks, the knob-spindle is made without a swivel, and security is obtained by a bolt on the inside.

Locks are designated as being either right or left hand, though the distinction is one which is confined entirely to the latch. A left-hand lock belongs to a door fitted with left-hand hinges, as has been previously explained, the term right or left being decided by whether the door turns on the hinges

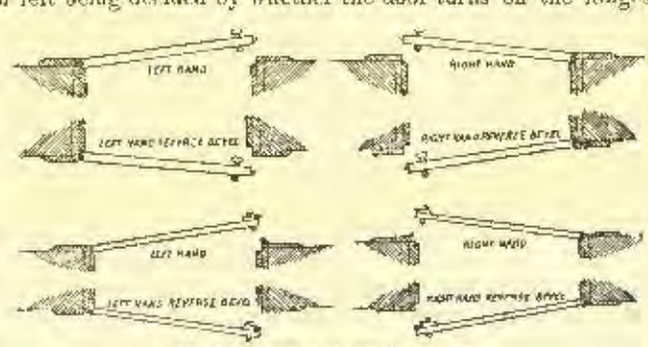


Fig. 290. Right and Left Hand Locks.

when opening either in the direction of the hands of a clock or the reverse. Locks are also designated as being either left or right hand reverse bevel, the reverse bevel applying to a door which swings out instead of swinging in. That is to say, in the case of a front door, for instance, if it swings out the right latch would be on the outside, but the latch bolt would be just the reverse in arrangement from what it would be, relatively, on an ordinary front door swinging in.

Figure 290, will fix this distinction clearly in mind. The figure is taken from the catalogue of the Yale & Towne Manufacturing Company. It is believed that the distinction between right and left, and reverse bevels is seldom appreciated by architects.

It is very often desirable to have a latch which can be reversed so that if any mistake is made in ordering, the lock will not be useless. Reversible latches are made in several ways the latch shank being generally of such shape as to permit its being turned over and worked in the opposite direction, without interfering with the action of the lock.

Locks wear out not so much by actual failure or breaking of the parts, but by the lever and key wards being worn so that the key will not lift the levers and permit the bolt to pass. Key-wards are the slight projections which are cast on the inner face of the lock-plates to form an additional obstruction to the passage of strange keys. Of themselves they affect the value of a lock but little, as the key will operate as well without as with them, so that the only part which actually wears out is the edge of the levers against which the key acts. The constant striking and turning, when a lock is used continually, will in time wear off the surface of the lever so that it will not rise quite sufficiently to allow the bolt-post to pass. The springs, also, sometimes become brittle, and the follows operating the latch will wear so as to work loose and rattle, but a little tinkering can remedy any of these difficulties. It costs but a trifle to have a new key made which will fit a partially worn-out set of levers. New springs are inserted at a trifling cost, and if the latch-spring is lengthened a trifle the rattling of the follows can be obviated; so, there is, really, no reason why a fairly good lock should not last indefinitely. It is, also, a very simple thing to make a new combination of the levers when they cease to work smoothly, and renewed life can thus be imparted to an apparently worn-out set of works.

In judging of the intrinsic worth of a lock, therefore, the following conditions should be carefully observed.

First: Good material for the use to which it is put.

Second: Careful adjustment, so that the parts will work easily and will stand any possible strain in use.

Third: The whole secret of the value of a lock is in the levers, which should be so made as to ensure a minimum of friction, of material not easily corroded nor easily worn away; and they should be adjusted to secure the greatest amount of security against picking, with springs not too easy, nor so hard as to bring undue wear on the levers.

A very good test of the workmanship of a lock can easily be made by shooting out the bolt, removing the cap to the lock case, and then pressing in strongly on the bolt, at the same time lifting the levers, one by one. If the gatings are accurately fitted they should all bear equally against the bolt-post, so that the gating of no one lever would catch on the post as it is lifted by. Few of the ordinary locks will stand this test successfully.

Intricate combinations, made ostensibly to prevent the lock from being picked, add very little to its value for ordinary house work. It may be safely stated that any lock can be picked which is operated by a key, so that a good three-lever lock affords all the intricacy and gives one all the protection that could be desired. A lock has a personality of its own, and so much of its value depends on the maker that it is wise in purchasing to always get the best; keeping in view simplicity, and the points previously noted. A cheap, but well-made lock is better than an expensive one which is put together in a careless and indifferent manner.

[To be continued.]

THE ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE ALGONQUIN CLUB-HOUSE, COMMONWEALTH AVE., BOSTON, MASS. MESSRS. McKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine print, issued only with the Imperial Edition.]

TWO STREET VIEWS IN QUEBEC, CANADA SKETCHED BY MR. ROBERT BROWN, JR., ARCHITECT, BOSTON, MASS.

See paper on "Quebec" elsewhere in this issue.

SUGGESTIONS AS TO THE CONSTRUCTION OF SLOW-BURNING HOUSES, CHURCHES AND HOSPITALS.

For explanations see the following article.

HOUSE AT ROCHESTER, N. Y. MR. THOMAS NOLAN, ARCHITECT, ROCHESTER, N. Y.

SLOW-BURNING CONSTRUCTION.[1]

IN order to meet the frequent calls for plans for the safe or slow-burning construction of office-buildings, dwelling-houses, and other buildings auxiliary to the factories which come under the supervision of the Mutual Companies (such demands having more than once been made for plans of slow-burning churches and hospitals), certain studies are herewith presented which may be a good basis for suggestion and for further improvement.

These plans, even if they prove to be crude and imperfect, will certainly assure greater safety than can be expected when offices, houses, churches, and hospitals are built according to the common practice of combustible architecture.

The ordinary method of building a wooden dwelling, hospital, or other similar structure may be called the cellular system of construction. The floors consist of a series of wooden cells; the walls constitute another series; the roof is the worst and most dangerous series of all; each cell in each series being connected in some more or less open way with all the rest.

Provision is made in many contracts for cutting off the communication between the cells of the main floor and the vertical cells in the walls, either by laying bricks between the studs upon the sill or by some other suitable method; the intention of these safeguards being to prevent either vermin or fire passing from the cellar through the cells in the first floor to the cells in the walls, and thence throughout all the floors and partitions to the roof. These provisions of the contract are excellent *on paper*, but, when left to the average supervision of the architect and of the contractor, they are very apt to fail: the mice almost always find a way through the smaller cracks, and the rats follow; the fire also finds its way everywhere through all the cracks with the utmost facility. The writer knows from personal experience that even if the most careful provision be made in the contract, and even if the work be supervised day by day by the owner himself, all the customary devices may utterly fail to keep rats and mice out of hollow walls in a wooden house.

But even if the common contract precautions should suffice to keep vermin from infesting the house, yet the customary plan of construction utterly fails to prevent the passage of fire from cell to cell, and through the same cracks by which the fire may pass there is a constant circulation of air. This circulation of air, although it may be slow and somewhat obstructed, yet practically destroys the value of the air-spaces in the walls, which walls are assumed to be non-heat-conducting because of this air-space. It is admitted that, if air be encased in a substantially tight cell free from circulation, it may be one of the very best non-conductors of heat and cold; but the air-spaces in the walls of a wooden building, as ordinarily constructed, are nothing but a fraud; *there are small open-air ducts connected by cracks and crevices everywhere.*

It is generally assumed that an air-space is in the nature of things one of the best of non-conductors, without much regard as to how the air is encased; but the error of this assumption was disclosed by the experiments made at the instance of the factory underwriters a few years ago for the purpose of determining the conditions most favorable for preventing a loss of heat by radiation from steam-pipes. In the course of this work, which was of the most thorough nature both as to the methods employed and the extent and variety of materials tried, it was found that an air-space was a very good conductor of heat by reason of circulation by convection, which resulted and effected a very rapid transfer of heat; on the other hand, the non-conducting property of many substances which proved to be most efficient was undoubtedly due to the small, isolated cells of entrapped air which they contained. In our tests, a given material, when placed in a loose or porous condition about a pipe, proved to be an effective non-conductor; yet, when pressed to an extent which closed up the air-spaces or pores, the same material served as an effective conductor of heat.

It may be interesting to cite the fact that an air-space would transmit a quantity of heat represented by the number 1302, the radiation of heat through wool under similar conditions being represented by the numbers 301 to 237, according to the amount of pressure applied to it. Charcoal was found to be subject to about the same rule as wool. The application of these results to the construction of buildings leads to the conclusion that the most effective non-conduction of heat may be attained by cutting up air-spaces in such a manner as to prevent circulation by convection, or by the connection of one air-space with another.

An effort has, therefore, been made to make framing-plans and specifications, which are submitted herewith as studies of the question, for the construction of the class of buildings under consideration, in which the timbers shall be so arranged that the builder will be obliged to go out of his way and to work on an entirely different framing-plan, in order to connect one cell either in the floor or wall with any other cell in any other part of the building. The motive

[1] A Circular issued by the Boston Manufacturers Mutual Insurance Company.

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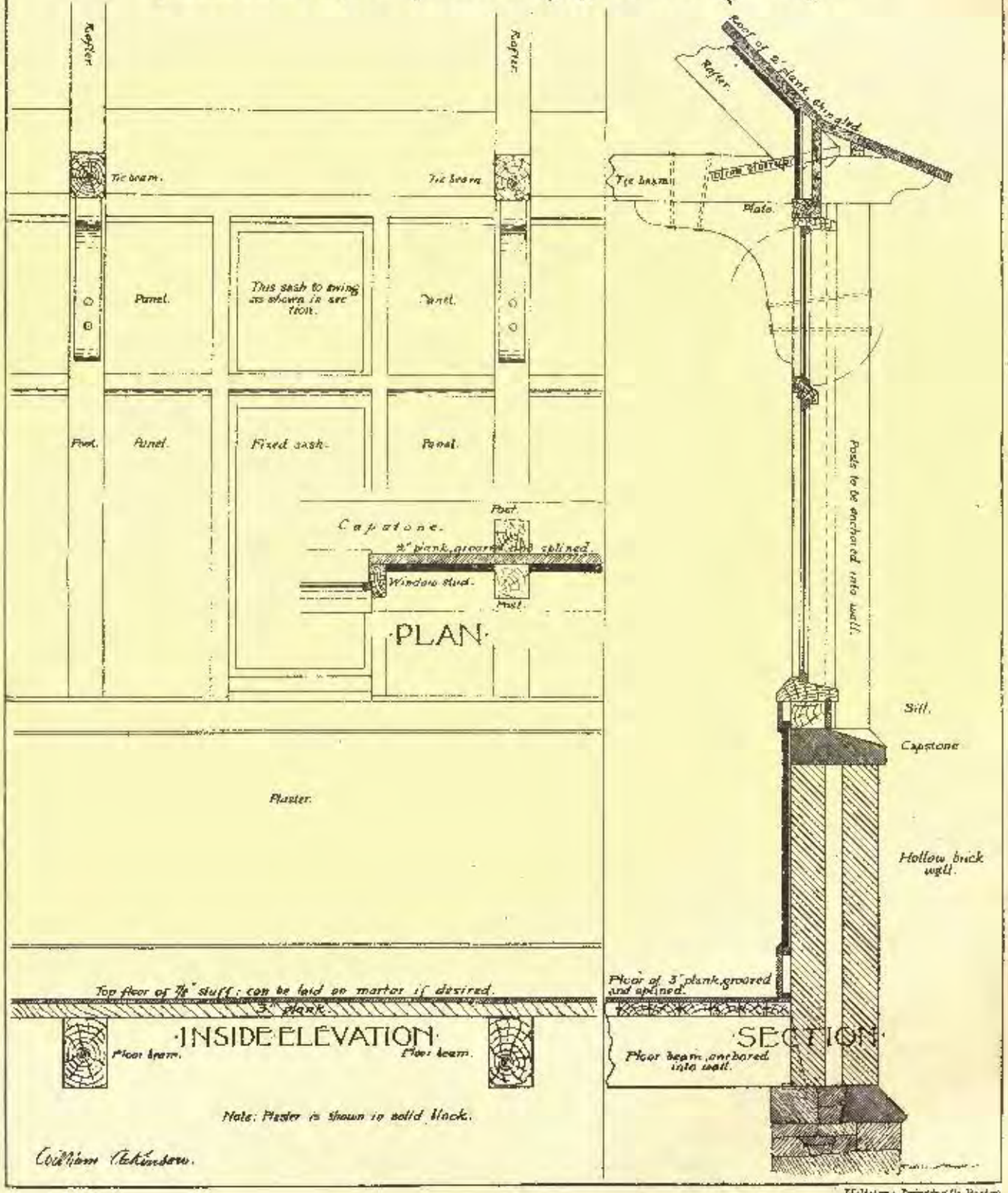
Associated Mutual Insurance Cos.
Plan for a Slow Burning Wooden Church.



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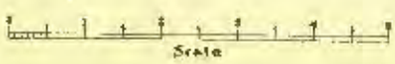
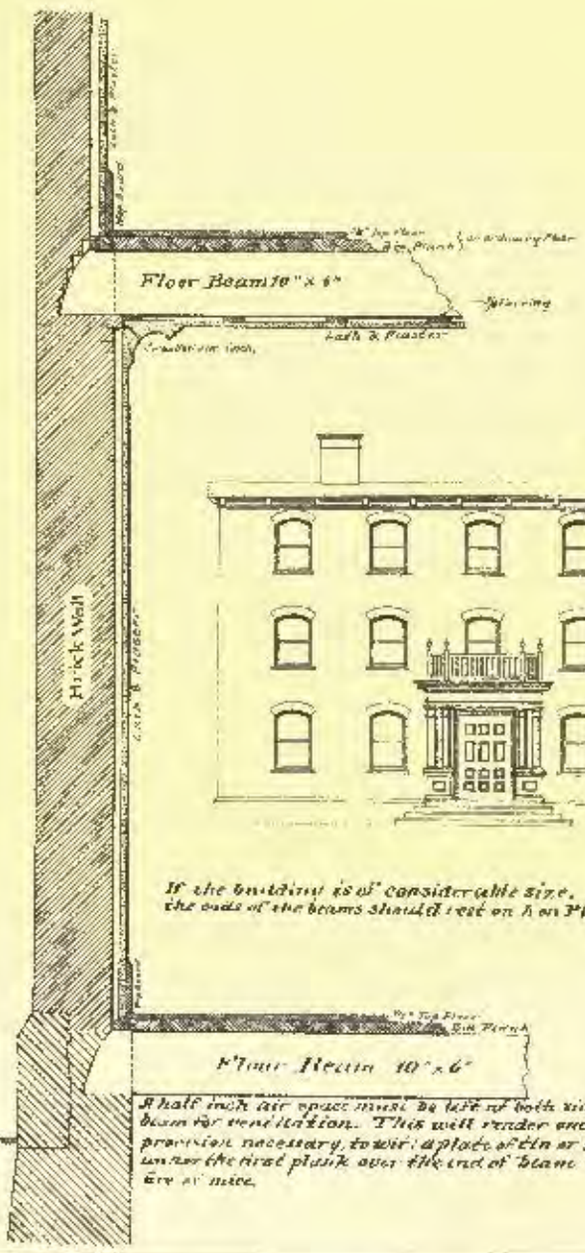
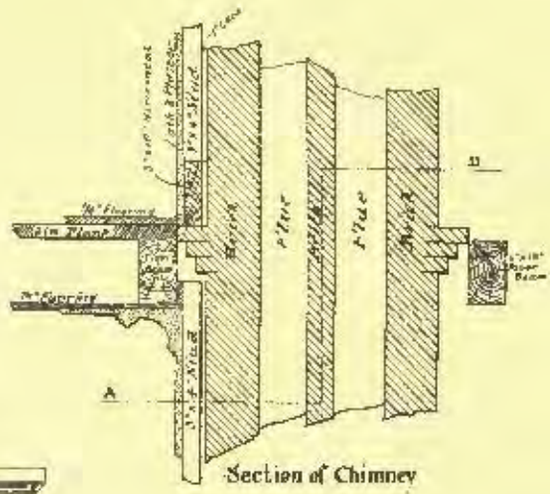
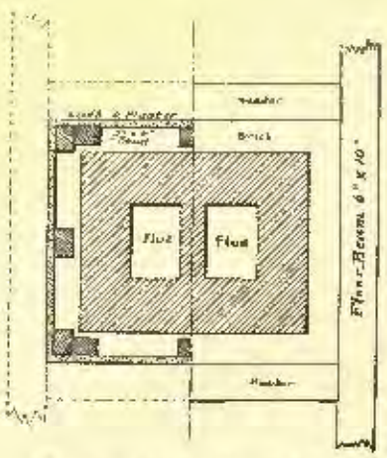
Plan for a Slow Burning Brick Hospital or Dwelling




Floor Beam 10" x 6"
Lath & Plaster
Brick Wall
If the building is of considerable size, the ends of the beams should rest on Iron Plates
Floor Beam 10" x 6"
A half inch air space must be left at both sides of the beam for ventilation. This will render any special provision necessary, to wit: a plate of tin or sheet iron between the tread plank over the end of beam to cut off any air space.

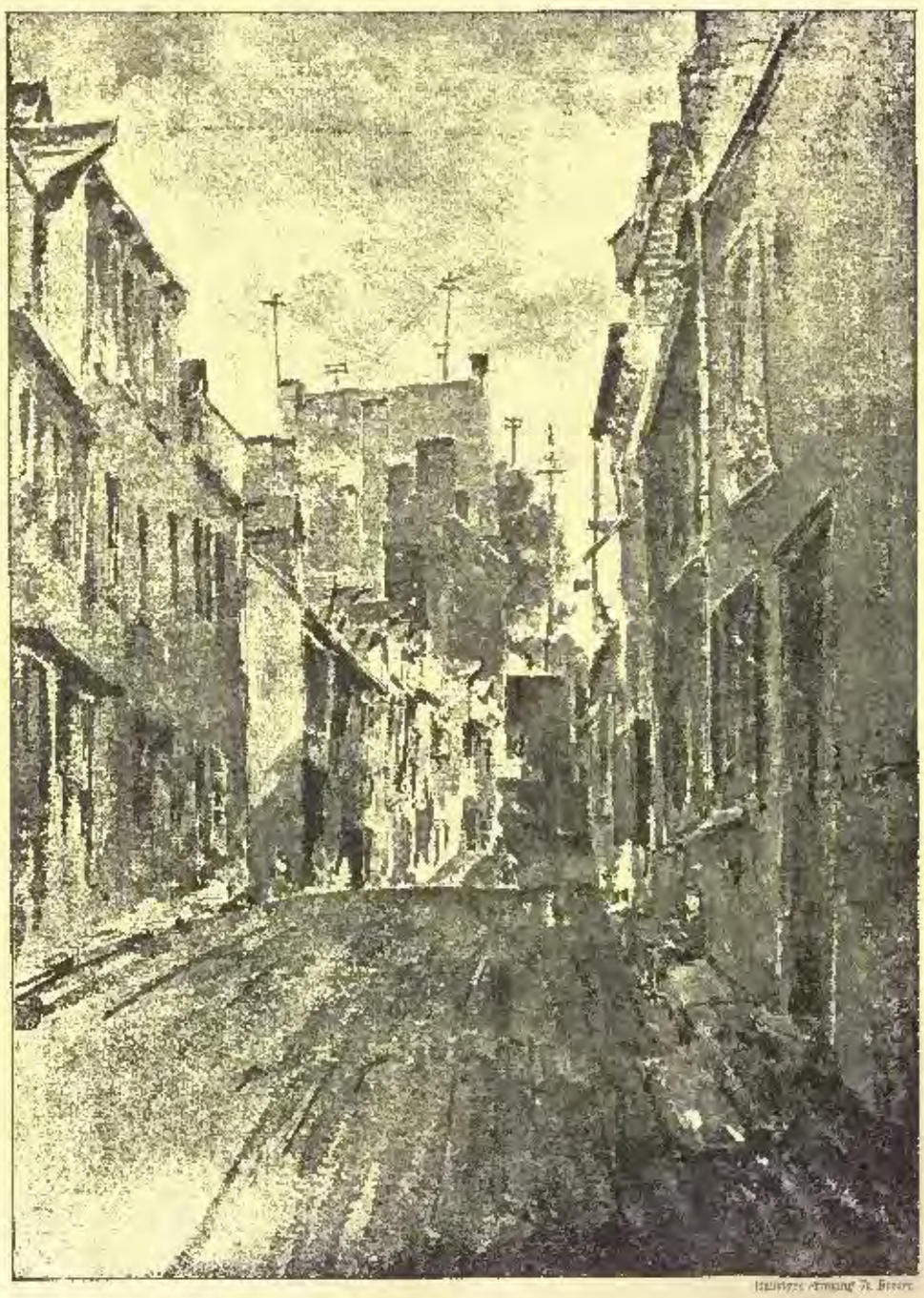


Section of Chimney



Horizontal Section at AB

Rehorne Printing & Binding



A STREET IN QUEBEC, CANADA. SKETCHED BY R. BROWN, JR., ARCH'T.

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THE ALGONQUIN CLUB HOUSE, COMMONWEALTH AVENUE, BOSTON, MASS.

McKIM, MEAD & WHITE, Architects.

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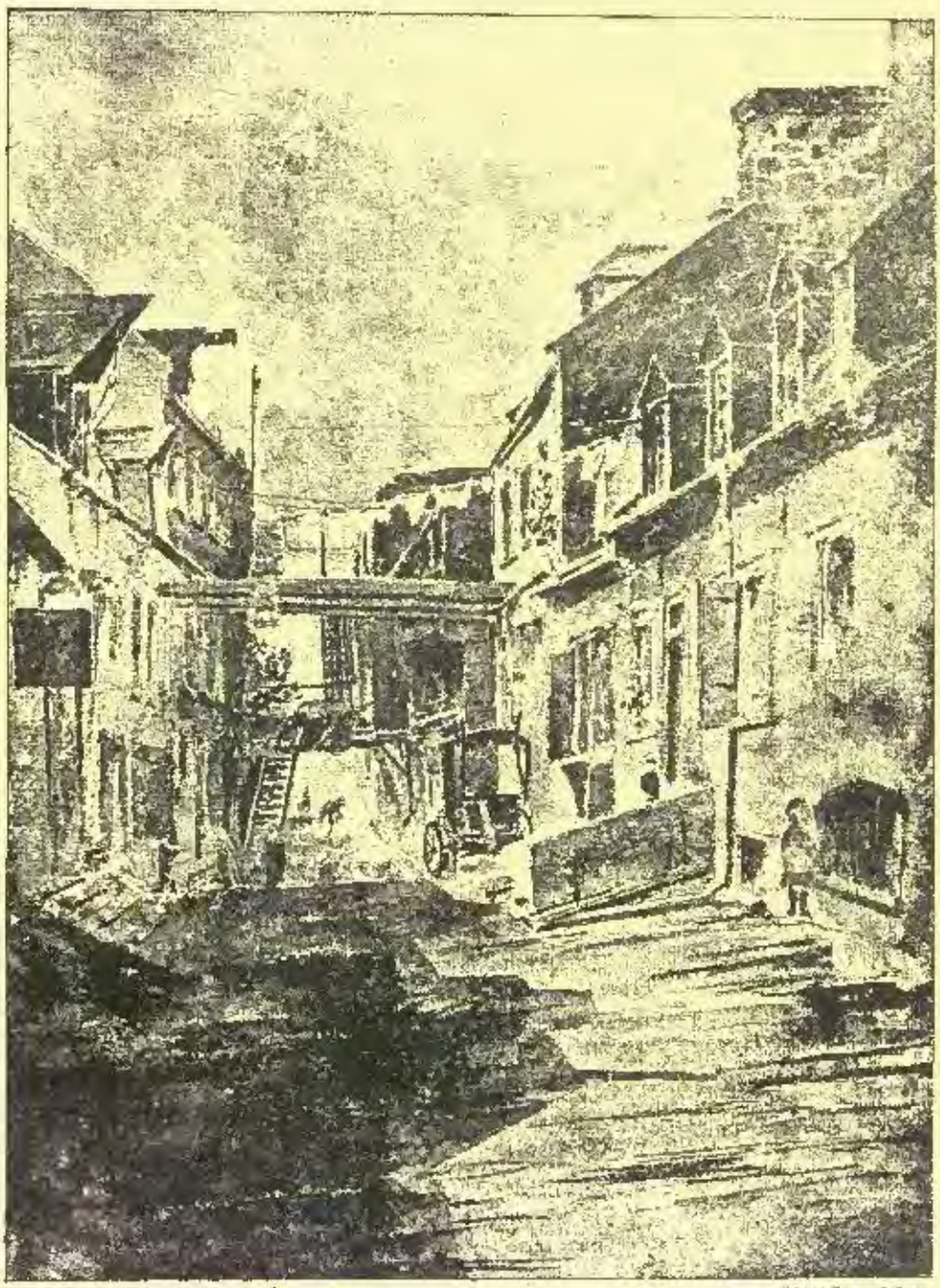

A STREET IN QUEBEC, CANADA. SKETCHED BY R. BROWN JR., ARCH'T.

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Design for House at Rochester, N.Y. E. NOLAN, Architect, Rochester, N.Y.

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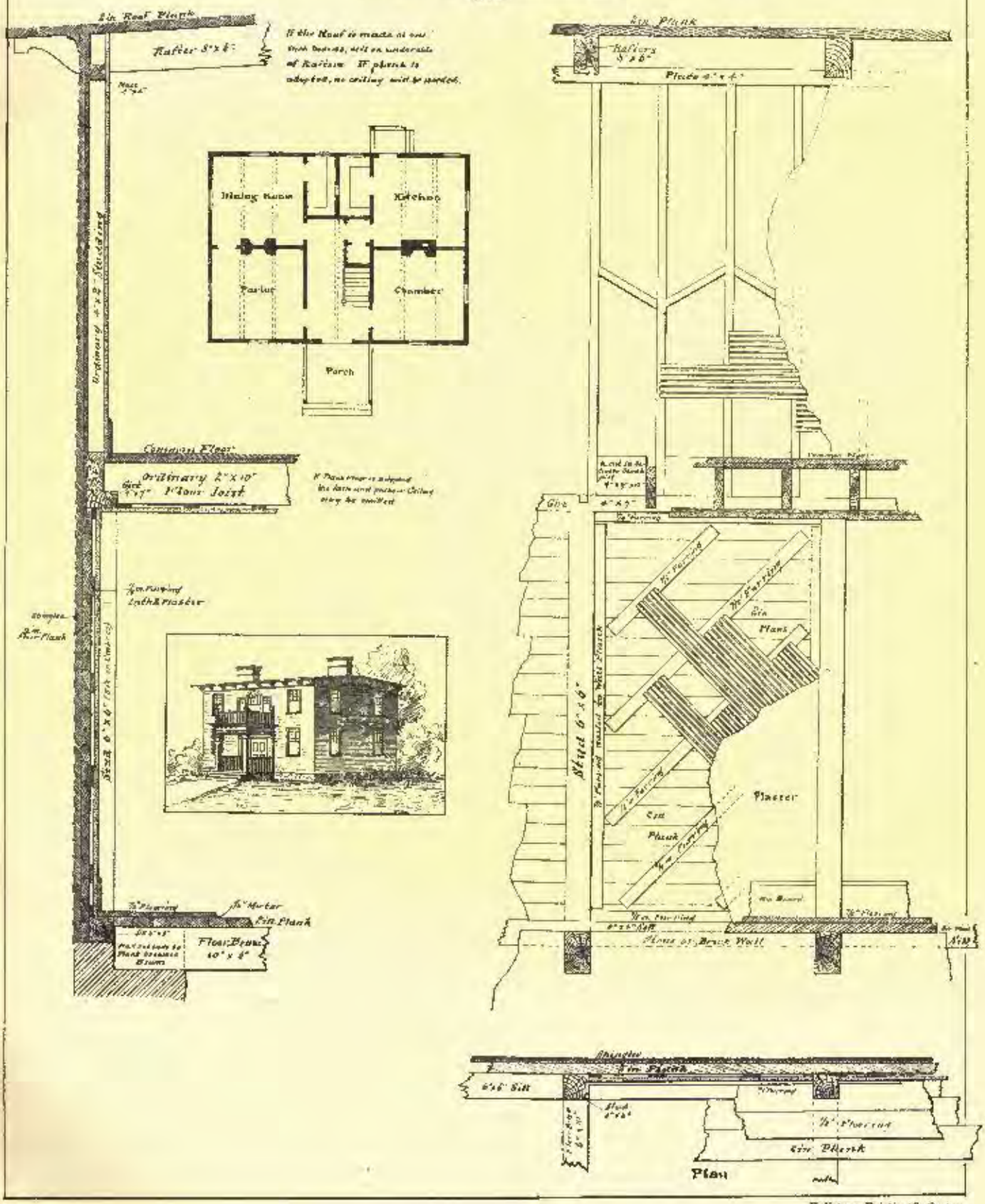
Associated Mutual Insurance Cos.
Plan for Building a Slow Burning Dwelling House.

Scale.



Heliotype Printing Co. Boston

is to compel the builder to do his work well in this particular, even if he does not care to do so, or might not know how.

On this motive the framing-plan of a church has been made by a student of architecture (sketch No. 1), and a framing-plan and method of plastering for a dwelling-house have been devised under my own direction (sketch No. 2). In respect to both dwelling-house and church, it is suggested that there is no reason why there should be any cells in the main floor, such as will be made if the basement-ceiling is either sheathed or plastered on the underside of the timbers. So far as this floor is concerned either in a dwelling-house or a church, there may be no objection to the downward passage of sound; therefore, the money commonly expended in sheathing or plastering had much better be put into the substance of the floor, and the open timber or mill-construction may be adopted on this story in any and every case. If this floor is made of two-inch plank grooved and splined, covered with three-fourths-inch mortar, good sheathing-paper, and then finished with a good, hard top-floor, birch preferred, the cold air of winter may be permitted to circulate freely through the cellar or basement without any danger of passing up through this solid floor, to the discomfort of those who occupy the stories above, and the upward passage of sound will be very slight. If the heat required in the main floor or story be brought in near the centre of each room a little below the ceiling, with right provision for ventilation, the floor will be well warmed at any and all times; while, on the contrary, if the heat be brought in through registers in the floor, it will rise and accumulate near the ceiling, while the cold air from the windows, which either comes in by the cracks or through the glass, will fall and spread itself over the floor, to the great discomfort of all the occupants. May it not be that people bake their heads and bodies, burn the air as it comes through the furnace, catch colds or get catarrh from vitiated air, in a vain attempt to keep their feet warm? Even in this they may fail, unless bottom circulation is induced by bringing the heat in at the top or overhead.

Under the common conditions of bringing the heat in through registers in the floor, there will be nearly stationary planes of different degrees of heat, to the discomfort of the occupants, cold in the lower plane, and very hot in the upper one, while by the overhead system there may be a very free circulation; even basements with stone floors, which have been of no use in factories when the steam-heating pipes have been placed in the usual way at the sides of the room, near the floors, having been converted into useful rooms, with warm floors, by merely changing the position of the same heating-pipes from the side-walls to points near the ceiling, ten or twelve feet from the windows.

To return to construction: even if the mill construction is considered too expensive for the whole house, and if it is thought that the downward passage of sound through the upper floors cannot be sufficiently prevented, then the motive of the architect may well be to make use of about the same quantities of timber and board which are now required in ordinary framing, but so disposed and so consolidated that, without requiring much more material, the cells in walls, partitions, floors and roof may be absolutely separated each from the other; the frame being at the same time made stiffer and better in every way; the substance of the roof also made thick enough to save the attic or upper story from being an oven in summer and a refrigerator in winter. To this end the plans of the dwelling-house are submitted. They speak for themselves. Posts and floor-beams may be 10 x 6 inches; studs, 4 x 6 inches, placed five feet on centres. These sizes may be substituted for the ordinary construction of 2 x 4 inch planks, posts and studs, with little or no increase in the quantity of material required in the lower story; the second story is drawn in the ordinary way.

The method of constructing the foundation, placing the sill thereon, and the method of adjusting the girders and plate, are so devised that even the most uninstructed builder cannot connect any number of cells anywhere without using more ingenuity than he customarily applies to the ordinary conditions of framing in making such connections. The diagonal furring and lathing convert the wall into a truss, strengthening the building, and this system of plastering on the plank, as drawn in the lower story, also lends itself to the separation of the cells in the best manner.

If the second story should be built of 2 x 4 studs, boarded and not planked, one special provision will be called for to cut off the second-floor spaces from the wall-spaces in the second story, to wit: solid blocks between the studs; but even if this were neglected, little harm would come from it, because there is no open way from the first to the second floor.

It may be suggested that a cheap method of making small wooden dwelling-houses much safer from fire, and also warmer in winter as well as cooler in summer is to fill-in between the studs behind the plastering and inside the boarding with sifted coal ashes mixed with mortar, just enough mortar being used to bind the material.

In this way many buildings of bad construction have been made suitable for mutual insurance to the great satisfaction of the owners, who have discovered after the spaces between the studs set up inside of brick walls with a view to the supposed non-conduction of an air-space, that their buildings have been made much warmer in winter, cooler in summer, and safer in every way, after the ashes and plaster had been poured from the top into these spaces between the studs, than they were before this precaution had been taken.

These plans and specifications are submitted as primary studies only, subject to suggestion and to improvement. The same problem needs to be solved for the construction of brick dwelling-houses and hospitals, as well as those built of wood. The Building Act of Boston and the customary forms of contract call for incombustible stops at every floor, behind the furring or mop-board.

Do these provisions suffice? In what proportion of the houses, hospitals, or asylums constructed under the present system are there not a number of more or less open ways, by which vermin or fire may pass from basement to roof? Cannot some framing or floor-plan be devised by which the ignorance, stupidity, or carelessness of workmen or contractors may be rendered incapable of opening a way for fire, except at an increase of the cost or of the work?

At the suggestion of the writer sketch No. 3 has been made, in which a plan is submitted for cutting off the connection between the air-spaces or cells of each floor from the air-spaces in the walls of a brick hospital or dwelling-house furred in the usual way, and for separating the latter at each story. It is admitted that if specifications like those of the present Building Act of Boston are completely carried out, there would be no need of any further provisions for fire-stops; but the carrying out of the provisions of the Building Act for placing stops at each floor calls for some additional work on the part of the builder, which may be omitted, neglected, or shammed. The motive of the suggestion submitted in sketch No. 3 is to build the walls themselves in such a way that, when the floors and the furrings are placed in position, the projections from the brick wall and chimneys will be interposed between the air-spaces, thus making the necessary stops without requiring any additional or special work to be done.

In order to stop the air-spaces which are of necessity left between the brickwork of chimneys and the studs which support the lathing around them, it is proposed to corbel the brickwork on the sides and the back of the chimneys as well as on the front.

The studs at the sides and on the back of the chimneys may be placed in position supported by brickwork, which will cut off any possible connection with the air-spaces in the stories below or above. A horizontal wooden support to the studs is placed over the brickwork (which timber should be laid on a thick bed of mortar between it and the bricks), in order to provide for the same shrinkage that may occur in the floor-timbers.

This plan may make safety consistent:

1. With economy.

2. Even with the rule-of-thumb methods of carrying out plans and specifications the motives of which the builders may not themselves understand, so that the faults in the present methods of construction will be cured without the extra work of putting special stops at each floor. It is in this way that the mutual underwriters have made it for the interest of every manufacturer to adopt their plans and methods; because, even taking no cognizance of the greater safety from fire, their plans and methods of construction have been conclusively proved to be the least costly ways in which buildings can be erected, which will be most suitable for the occupations upon which they take risks.

In the case of the hospital or asylum, again, if the mill floor and open timber construction are objected to above the main floor over the basement or cellar, the common cellular floors may be adopted; but, according to the plans submitted, there may be no direct communication between these cells and of one story with those of another.

It is assumed that when such attention is given to the slow-burning construction of a hospital or asylum as would be implied by giving attention to this suggestion, the same reasoning would forbid any of the common bad forms of roof, especially of the "crazy order," which now render so many of this class of buildings costly, dangerous and unsuitable. The solid deck-roof of plank, not less than three inches thick, would become a necessary element in this plan of construction.

The basement floor had also better be of plank, laid over a properly prepared concrete, in such manner that it may not decay and without any open space beneath in which fire or vermin can exist. Of such plans for basement floors we have more than one which have stood the test of time. Respectfully submitted,

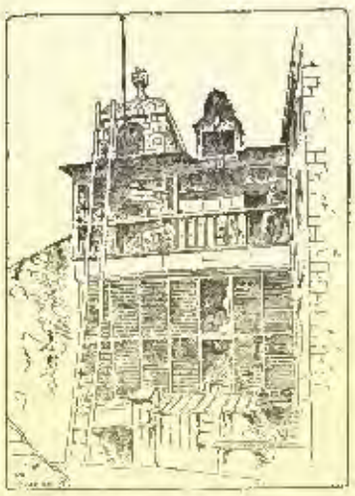
EDWARD ATKINSON,

President Boston Manufacturers Mutual Fire Insurance Company.

Boston, January, 1889.

LONDON'S WATER-SUPPLY. — A somewhat alarming view of the condition of the water-supply of London is taken by Major-General Scott in his official report published in the annual volume of the Local Government Board. "On a general view of the whole circumstances," he says, "it seems evident that the question of the water-supply of the north and east of London has entered a critical stage, and it may be said that the restriction in the supply found necessary by the East London Company during the past summer [1887] was a premonitory symptom of difficulties which in future seasons of scanty rainfall will be more severely felt." The Board also remark "that at no very distant period the margin between supply and demand may become perilously small; and that, at any rate, in the case of some of the companies, the question how the existing sources can be supplemented from others outside the watersheds of the Thames and Lea, is one of which the consideration cannot be long deferred." — *Pall Mall Gazette.*

A GLIMPSE OF QUEBEC.[1]



On Flavien St.

IF, in the course of the descriptive sketch which I have ventured to bring to your notice this evening, I diverge too much from the beaten paths in which an architect is supposed to tread, I ought to say, in explanation, that these observations on Quebec are chiefly the result of a brief holiday tour, and not the outcome of any serious study; and, if I become too discursive, I must plead the holiday attitude or present the plea of "general interest" allowable by our rules regarding topics whose relationship to architecture and the fine arts is not apparent.

When the heat of summer makes us long to leave the dusty city and our routine work, a sail to northern climes, to mingle for a time with a foreign race and hear another language spoken than our own — to sojourn in a country whose life and aspect is a perfect contrast to our own — gives rest and healthful change.

Nowhere will the sportsman find a better field for rod and gun than round about Quebec; and to the lover of the picturesque, to the artist in painting, poetry or romance this northern city gives themes of surpassing interest.

The scenery in the surrounding country is delightful. Other landscapes may be grander, more sublime, but none more interesting from the human existence and association wrought for three centuries into the very soil. It has what Matthew Arnold called "the charm of beauty which comes from ancientness and permanence of rural life."

The inroads of modern progress and the effects of increasing commerce have touched this northern capital but lightly. The conservatism of its religious life has left the spirit of a bygone century in every stone. In some aspects it is still mediæval. The *habitants*, from the country round, gather now in quaint groups in the market-place, just as they did a hundred years ago. They bring their flowers and fruit full many a mile. Their quiet horses stand in rows beside the wagons looking as much domesticated as the house cat.

Priests and nuns move in groups along the narrow streets or walk in procession on saint days as in the days of the old *régime*, and on every hand there is some landmark, some old building to remind us of stirring events in the life of the old colony — New France.

As in the case of the ancient capital of Scotland, so here, Nature has bestowed a site of incomparable grandeur. Abruptly from the

Sous Le Cap.

noble river rises the rock round whose base clusters the lower town, while higher up the churches, monasteries, towers, terraces and ramparts spring, until we reach the citadel which crowns the lofty summit.

A brief study of the topography of the place shows us at once a natural fortress. From the geologist we learn that the land on which the city stands was once an island, for at Cap Rouge, about eight miles above Quebec, the formation of the rocks distinctly show that a channel of the St. Lawrence forked northwards, and probably followed the present course of the Charles River. From Quebec to Cap Rouge the bank is formed by towering rocky headlands, the slope on the northern side to the valley, in many places, being almost as steep.

From the terrace called Durham, on a summer's evening as we stand more than two hundred feet above the river, a truly magnificent panorama lies before us. So steeply does the cliff fall away from the terrace that we look down on the chimneys and roofs of the lower town, and wonder how the people there live under the snowdrifts of winter's long reign. The broad, sombre river flows northwards and eastwards from the Isle of Orleans. On the northern shore the eye follows a winding road, along which straggle little cottages, each with a ribbon-like strip of farm-land, and here and there a church — the village heart. Beauport lies nearest Quebec, then Montmorenci, L'Ange Gardien, Château Richter and Ste. Anne (La Bonne Ste. Anne, as the villagers lovingly call it), until in the blue gray distance Cape Tourmente, forty miles away, closes the vista. The scene looked peaceful and beautiful in the deepening color of the setting sun, changing from green to purple the Laurentian range of mountains which bound the view to the northward.

In the valley to our left, the narrow Charles River flows on its sinuous way to join the St. Lawrence. It was on this river near where a little stream, the "Lairet," joins it, that Jacques Cartier, of St. Malo, wintered in 1535, and the remains of the fortification built there by him, three hundred and fifty-three years ago, can still be seen.

In 1608, Champlain landed at Stadacona, which was the Algonquin name of the place where Quebec now stands, the word meaning the narrowing of the waters, for the St. Lawrence is, at this point, less than a mile wide. Champlain and his followers founded the city, and he was the first governor. From that time, down to 1759, one governor followed another, each appointed by the ruling powers of France.

The city has been besieged no less than five times, and often been the prey of extensive conflagrations. The last great siege of 1759 must have laid in ruins the greater number of its buildings; yet, considering these devastations, it is surprising to find so many structures with the stamp of age. As the French people, after Canada had passed into the hands of the British, were left with entire religious liberty and their existing institutions, untouched, we may presume, that, with their conservative instincts, they rebuilt and restored on the old lines, or in the same spirit.

The wall on the western side of the city still stands, but, within the past half century, the last of the old gateways was taken down. The

Ste. Famille St.

old archways were found too narrow for the increasing traffic, and, instead of diverting the road to one side and piercing the wall with another archway as might have been done, the old gateway with its guard-room over loopholed for firing on the enemy, was also demolished. The modern gateways are prosaic-looking, and without interest to us. Quaint and picturesque as this gray old capital is now, how much more so must it have been in the middle of last century. Let us hope the Quebec Historical Society, so far as its influence can go, will carefully preserve all that is left, and save the city from further acts of vandalism.

The churches and chapels are, perhaps, the most interesting of the buildings in Quebec. Chief amongst them is the French Cathedral consecrated in 1666 by Monseigneur De Laval, the first bishop of the colony. The style of the present interior is that of the time of Louis XIV, and this style pervades the interiors of the other churches as well. There is much gilding and white paint. The church is of good proportions, with a lofty nave, covered by an elliptical vault under a high pitched roof. The windows are semicircular-headed, without stained-glass and divided into small panes. There are two sets of sashes, the outer being flush with the outside face of the wall.

We are accustomed to associate the style of Louis XIV with ball-rooms and apartments devoted to festive purposes, and one might suppose in a church such a style would not lend itself to the devotional spirit, but, to my surprise, it seemed quite otherwise.

I stood near the entrance, far back, and took in the whole picture. One by one the worshippers came in, dipping their fingers as they passed into the holy-water near the door, then kneeling in the foreground or by some side altar. The brilliant high-altar and the large paintings which adorned the walls; the richness of the gilded ornament, the scarlet capes and gold lace of the vergers, the organ in the western gallery and the foreign look of the congregation, made up a most impressive picture. It brought to mind stage-scenes of Irving's, and, but for the costumes of the people, might have been part of the seventeenth century.

I was given a seat near the pulpit in the nave; the singers sang out right lustily, attracting a young lady in front of me who turned around and cast piercing upward glances towards them through a pair of eyeglasses, which at once suggested Boston. Excepting this slight interruption, I felt as though I must be in Europe, so distinctively foreign were my surroundings, and when the warden came

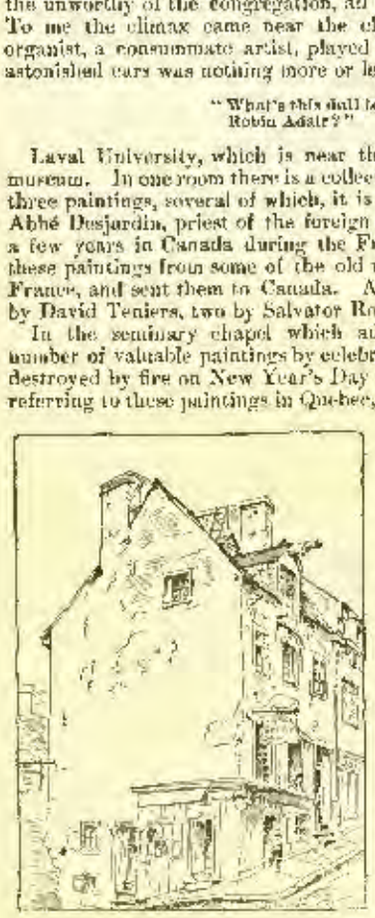
[1] A paper by Mr. Robert Brown read before the Boston Society of Architects, Friday, Feb. 1, 1889.

around with his collection-box, guarded and shadowed by the verger resplendent in scarlet and gold, and carrying his insignia of office aloft, I never dropped a coin more willingly. The priest at the altar robed in gorgeously embroidered vestments, the acolytes in attendance, the wafting of fragrant incense from burning censers, swung first towards the altar, then to the choristers and lastly to us, the unworthy of the congregation, all heightened the general effect. To me the climax came near the close of the service, when the organist, a consummate artist, played slowly and softly, what to my astonished ears was nothing more or less than the old familiar air:

"What's this dull town to me,
Robin Adair?"

Laval University, which is near the cathedral, contains a large museum. In one room there is a collection of one hundred and thirty-three paintings, several of which, it is said, were sent to Canada by Abbé Desjardin, priest of the foreign missions in Paris, who resided a few years in Canada during the French Revolution. He bought these paintings from some of the old nobility who were then leaving France, and sent them to Canada. Among the collection are three by David Teniers, two by Salvator Rosa and one by Tintoretto.

In the seminary chapel which adjoins the university, were a number of valuable paintings by celebrated masters, all unfortunately destroyed by fire on New Year's Day of last year. Some writers in referring to these paintings in Quebec, have been quite sceptical as to their genuineness. I cannot speak from the standpoint of an expert in this branch of fine arts, but my impression was that many of these paintings had all the characteristics of the several old masters whose names are attached to them, and with reference generally to the large paintings which are framed and hung on the walls of the various chapels and churches, it is immaterial, when we consider their decorative value in the interiors.



Soul Le Fort.

After the cathedral, the most interesting chapels are those of the Ursuline Convent and the Hôtel Dieu. At the former convent you talk with a nun, invisible behind a metal plate, at a barred opening in the hall, and a servant is sent to show you the chapel. The convent was founded in 1641 by Madame De la Peltrie, and afterwards rebuilt in 1686. A monument to the memory of Montcalm is in the chapel, and here lie his remains.

Quebec is a city of contrasts. On a Sunday afternoon I entered the town by the place where once stood the Palace Gate, through which Montcalm rode in hot haste to defend the town. Sounds of primitive music came from a building up the street: the Salvation Army had taken possession. I turned down a narrower street, to the left, and heard a softer strain of music coming from the convent walls. I opened a door and entered an outer garden from which, beyond another wall, I saw through the open windows of a side chapel the veiled figures of the nuns rising and falling as they sang the sacred chants. In the chapel, to which visitors are admitted, were a few worshippers; the arched opening to the side chapel was filled with a metal grating which hid the nuns from view.

The early history of Canada, when Jesuit priests went out to Christianize the Indians, is filled with many a martyr's story. There is nothing in all the annals of the early Christian martyrs to compare with the terrible fate that befel Jean de Brebeuf, a man of noble lineage. It would horrify you were I to relate his torture, yet never did man die more bravely or heroically. "His family sent from France a silver bust of their martyred kinsman, in the base of which was a recess to contain his skull, and to this day these are preserved with pious care by the nuns of the Hôtel Dieu."

One of the most delightful excursions from Quebec is that to the village of Ste. Anne de Beaupré, about eighteen miles down the St. Lawrence. The journey may be performed by either road or river, but the tourist would do well to include both. It will well repay him. A little steamer leaves the wharf at the lower town, about six o'clock in the morning. We sail past the Falls of Montmorenci, a body of water leaping down a sheer precipice full two hundred feet in height. There are saw-mills along the shore near it driven by water-power, and the same force has been ingeniously utilized to generate the electric current which lights Quebec eight miles distant. The spot is memorable, too, as being the scene of Wolfe's first attack on the French, when he had to retreat with a loss of over four hundred men. We sail past groups of quaint-looking farm-houses which form the sleepy villages, stopping now and then at landings by the flats on the river side, until about eight o'clock we step ashore under the lee of steep hills.

At the suggestion of my travelling companions, two French Canadians from Quebec, we repaired, with sharpened appetites, to the Convent of the Sisters of Charity for breakfast. This institution partakes of the character of an hostelry, providing in the refectory plain, substantial fare for the wayfarer and pilgrim. The rates and other particulars about boarding, which are printed in French and English, are hung in the hall. The novelty of the situation led us to think of staying all night, but a chat later on in the day with the girl who sat knitting in the hall and acting as doorkeeper, revealed the fact not explained in the rules and regulations aforesaid, that the regular boarders must be of the gentler sex.

There are hotels enough in the village, one-half of them called "Hôtel de la Bonné Ste. Anne." They are not so picturesque as one would like, for most of them are modern; but, in spite of this, one is again and again here reminded of French country-life. A girl hay-raking in a field comes down the road when she leaves her work, looking the very counterpart of her Normandy cousin, or as if she had stepped bodily from one of Millet's peasant pictures. In this pleasant village, under the shelter of a hill called Petite Cap, the pious Governor Aillebout, in 1658, began a church with his own hands; and here I must quote the historian: "Louis Gruimont, a habitant of Beaupré, sorely afflicted with rheumatism, came, grimacing with pain, to lay three stones in the foundation, in honor, probably, of Ste. Anne, St. Joachim, and their daughter, the Virgin. Instantly he was cured. It was but the beginning of a long course of miracles, continued more than two centuries, and continuing still." Every year, pilgrims came from all parts of Canada and the United States, numbering hundreds of thousands annually. There were cures reported in the newspapers while I was in Quebec, but no miracles were wrought on the day I visited the church, perhaps because it was a Friday, an inauspicious day. Lest any one should doubt the reality of these marvellous works, there stand inside at the western end of the church two circular wooden stagings, about four feet diameter at the base, and from thirty to forty feet high, on which hang many an old stave and crutch, left behind by those who have been cured at the shrine of Ste. Anne.

To the antiquarian, it is a matter of deep regret that the old church was taken down. In 1871 it was still standing, but in a ruinous condition. About two years later a new church, on a much larger scale, was begun, and in due course finished. The old church, to judge from the photographs of it, must have been a quaint and interesting structure. On the site where it once stood a chapel was built, and the picturesque double bell-tower of the old church, shown in this sketch, surmounts it. The old stones were used to build the walls, and some of the old parts of the interior were used in the new chapel. It is thus not destitute of the interesting element, especially as it contains some highly-prized relics, but the big new church across the road, like all the modern work in and around Quebec, very grandiose in its way, has little, if any, artistic merit.

A study of the history of the country leads one to suppose that the building and decorative arts never attained to any marked excellence, nor could this be otherwise. The people were too much under the surveillance of their religious teachers, and their time too much taken up with religious work and exercises; or else they were engaged in war with the Indians, and latterly with their neighbors, the British colonists, whilst the resources of the country, the harvests of the land and sea, were but half developed.

The historian tells us that in the seventeenth century the nuns of the Hôtel Dieu made artificial flowers for altars and shrines, and the boys of Laval's Industrial School, at the seminary, were taught to make carvings in wood for the decoration of churches. Pierre, son of Le Ber, a Montreal merchant, had a turn for painting, and made religious pictures, described as very indifferent. His sister Jeanne, an enthusiastic devotee and recluse, made embroideries for vestments and altars, and her work was much admired and greatly in demand.

There were repeated complaints from the governors and intendants as to the dearth of skilled workmen. The demand was greater than the supply, so it would seem that the priests in charge of the schools were more successful in making good Catholics than good carpenters, masons, blacksmiths, and weavers.

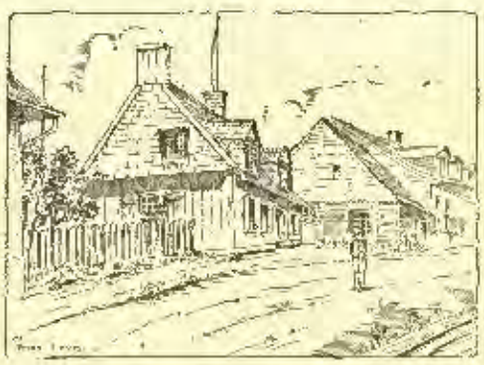
As far as I rambled, there was hardly a moulding or bit of detail worth sketching for further study, but it is possible that I did not explore thoroughly enough. Once, while rambling through the blank corridors of Laval University, I came upon a wooden chimney-piece which reminded me strongly of those still to be found in our old colonial houses. In one of the pencil-sketches you will see what might be called a bit of New England in New France. This was a house of some importance in its day, being occupied by the French governors, but it is now all gone to rack and ruin.

One cause of gratitude we have towards these Northern Frenchmen is that stone was their chief building material. It gives at once a sense of solidity and depth, even when covered, as it often is in many of the older buildings, with a whitewashed coat of plaster. The heavy chimneys, high gable walls, and deep reveals help the effect. Not uncommonly we see the exposed gable-end, and even the chimneys of a cottage, covered, as an additional protection, with wood outside the masonry.

You will notice in this sketch, at Point Levis, across the river from Quebec, three different types of wooden houses: first, the oldest, with solid timbers laid horizontally, and dovetailed at the angles, the joints being filled-in with mortar; next, a later type shows the exterior covered with upright planks or boards, even the gables and chimneys being similarly covered; and lastly, the latest

type of all shows a wide projection of the eaves, sometimes extending about a yard from the wall. This is a particularly effective feature, giving a bold shadow, and protecting the upper part of the wall from the weather.

I observed on the country-road to Montmorenci, that the fronts of the cottages were not always placed parallel with the road, being very often at angles with it, when the road changed direction. The simple explanation of this was that the cottages were built with the gable-end towards that quarter of the compass from which the stormy winds would blow, but it is needless to add that, besides the uses of this expedient, it tended greatly to the general picturesqueness.



Point Levis.

The barns in the rear of these cottages were quaint-looking and admirable in color. At the apex of many of the gable-ends the roof projected, as in sketch, forming a kind of hood. In the city many old-looking dormers are to be seen with similar projecting roofs. A telescope form of chimney, such as appears in another sketch, is another feature occasionally found.

From a study of roofs, one soon notices that ladders are left there all the year around, which would seem to indicate that repairs are frequently needed, owing probably to the frequent use of unpainted tin shingles. And yet, in spite of its drawbacks as a roof-covering, this material has to a stranger — that is, to the artistic stranger — a very charming effect. It soon, by exposure to the weather, assumes a steel gray and gray-green appearance, and those portions which turn rusty have the color of burnt sienna. The effect in the distance is to relieve masses of dull gray by a glistening sheen, like gold, on the rustier roofs. I saw, on the way to Montreal, an old windmill that was almost black, covered with a dome-shaped roof, which shone like burnished gold. It seemed hard to believe that it was simply rusty tin. In the design of the belfries, you will observe that the lower tier of arched openings is almost invariably repeated above on a smaller scale. These belfries often have finials and crosses of wrought-iron, generally light in appearance, as at the Ursuline Convent. There are also iron crosses by the roadside, on the way to Ste. Anne, which doubtless came from France.

In the early days, when the ships sailed only once or twice in the year to the old country, the governors and intendants were much given to writing what might be termed long-winded epistles to the ministers at home; and, as the home government was remarkably considerate of the young colony's claims, it is more than likely that much of the church interior furnishings, such as paintings, metal-work, and embroidery, came from France.

Glancing into the wayside cottages as we passed, we could often see an old chair or a table, plain and simple in form, but undoubtedly ancient. It seemed, therefore, that the town would not be complete without an old curiosity-shop, and when we found it, this, too, was satisfying. It partook very much of the character of a museum, and must be a perfect mine to the archæologist and the antiquarian. It was a rare and varied collection: swords, muskets, and bayonets picked up on the field of battle; bullets and cannon-shot; a piece of the chain that moored one of Jacques Cartier's ships; old Indian curiosities, geological specimens, coins, furniture, silver plate, metal and china ware — filling in all three large rooms. Of old French art there did not seem to be much; but no doubt the curio-hunter has long before this ransacked the country and borne away such booty. Other things seemed to suggest the departed glory of English families, who have probably either gone back to the old country or come to grief in this.

And now a few words about Quebec as a field for the artist. Some of you, in your rambles round about Boston, have perhaps lost many an hour hunting for a subject to sketch. We all know what that means — something interesting, picturesque, and good in composition. I dare say you have found that Nature is not always pictorial. In and around Quebec you will find subjects plentiful, without much need to change or modify, the whole composing happily. It may be a view in the rear of a house, with an old grouping of various accessories in the back-yard; a few chimneys and old roofs; a large azalea in flower amid ruin and decay; or an old tannery with orange-russet color in the bark on the ground, and dark amber color on the barns and roofs — the hides hanging on a line. Again, there are old boats, stranded on the river-bank — old wharves going to decay, grown gray, green, and umber in color.

Many painters in France represent green fields with a color which any one at all familiar with the work of different schools would recognize as distinctively French. Now, around Quebec, I saw more than once in the fields just such a color of green. Was it merely imagination, or had the landscape become susceptible to French influence, and thus resembled the mother-country? I should be glad to know, from those who have been in both Old and New France, whether this theory has any basis of fact.

From what I have already remarked about the rural districts, it is almost needless to add that the figure-painter, also, finds charming subjects here. In a word, it is a painter's paradise, and some of our Boston artists have found this to their profit. The majority of us, who are but amateur dabblers in landscape-painting, and even those who have no talent for sketching, may benefit largely from the quiet study of such scenes as these. To enlarge our horizon, to rest and drink in the silent influences of the time and place — by the very contrast this makes with our work-a-day world — will surely bring freshened and original thoughts.

Before seeing this country you should know its history well, and, if you read Francis Parkman on this subject, you will be astonished to find how much of an outline your school-history has become. It will afford you, at the same time, a glimpse of this country in the early colonial days, and you will feel grateful to the historian for his able work, doubly enhancing, as it will, the enjoyment of your tour.

With much that is romantic in the annals of New France, we have here also an historical study of peculiar interest. How, on the one hand, the British colonies, peopled for the most part with a race trained in habits of self-reliance, grew strong and independent; on the other, this colony of New France, of earlier birth, but always under paternal leading-strings, reflecting in its later life some of the corrupting influences at work in the mother-country precursory to the French Revolution; and when the end drew near the gathering of the army to defend Quebec, the story of that long summer's siege, the splendid strategy of the gallant Wolfe, his death in the hour of victory, and the brave Montcalm in the hour of defeat — all reads like a page of some grandly written drama. Wreathed with such thrilling historic associations as these, this hoary old town must ever remain a delightful Mecca to all thoughtful and observant pilgrims.

BUILDING LAW

THE aim of this department will be to answer such questions of law arising out of building transactions, and of general interest to the profession, as may be sent in to the editors by subscribers or others, and also from time to time to discuss in a more general way the various legal questions which are continually arising between architect, contractor, and client. The principles of law applicable to building disputes will be presented, so far as practicable, in the language of the layman, rather than in the technical garb of the lawyer's brief, and as concisely as possible. If correspondents desire further or more detailed answers than the scope of this department and the space at its disposal will permit, they can be accommodated on special application to the editors.

The solution of questions involving a knowledge of local regulations can — with the exception of the building laws of the city of Boston — hardly be attempted, owing to the difficulty of obtaining the ordinances. The questions that interest architects, however, and the disputes they are called upon to settle, usually involve merely a correct application of the general principles of the Common Law; being seldom controlled by the statute laws of the several States, and more rarely still by city ordinances.

A greater diversity of service is expected of the modern architect than of any other class of professional men. He must not only be skilled in construction and design; he must look after the financial interests of his client; he must act as arbitrator in disputes between the latter and the contractor; and he is expected to pass on every question of law that arises during his employment. All this wealth of learning, skill and business keenness is expected to be at his client's disposal without extra compensation; and it is not strange that oftentimes the architect gets weary and the client dissatisfied.

Probably none of the many problems which the nature of his calling and the oftentimes unreasonably exacting demands of his client throw upon the architect give him more trouble than the legal difficulties which surround all building operations. From the selection of the site and the drawing of the contracts and specifications to the payment of the last bill, or the termination of the last law-suit, questions are continually arising which demand some knowledge of the law. These cannot generally be referred to a lawyer, partly because the owner will not stand the expense, and partly because an accurate and ready answer to many of them would demand a more thorough familiarity with building methods than most lawyers possess. An acquaintance, therefore, with the rules of law applicable to building transactions is essential to the architect; but it is not such an easy thing to acquire. The law-books devoted to the subject are few in number, and totally inadequate in substance from the standpoint of both architect and lawyer; study of the building cases in the law-reports is laborious in the extreme, and altogether unlikely

to lead a layman to correct conclusions. Practically, therefore, the usual road to accurate knowledge of the law for builders, architects, and owners is the vexatious path of litigation.

It is not that the rules of law applicable to building operations are complicated or uncertain; they are, on the contrary, few and simple; but for this very reason, and because of their general character, they are usually taken for granted in the cases and books on building. It is, therefore, the more general works, the books on agency, on real property and on contracts, that the layman in search of building law must digest, and that is generally a task for which he has not time.

The characteristic feature of the English common law as distinguished from the jurisprudence of continental Europe, founded mainly on principles inherited from the days of the Roman law, is its freedom from special branches and special rules applicable to particular subjects only. The fundamental principles of the common law are extremely few, and they are of general application. There is, for instance, no "building law," strictly speaking; that is, there is no set of rules of special and peculiar application to buildings. There is no special law of party-walls, there being no such thing in our system of jurisprudence as a "party-wall," considered as a distinct species of property with special legal attributes. There is no law peculiar to architects as such; they have with us no definite legal status, as in France and other countries. An architect has, in our law, no authority whatever as such, and all his legal relations with his client are to be determined simply by the general rules of agency and contract. Thus the questions commonly put by architects to lawyers: "Can the architect do so and so?" "Has the architect authority to order such and such things?" are in that form incapable of being answered, for the extent of the architect's authority depends in every case upon the instructions which he has, in fact, received from his client.

A full appreciation of the fact that we have no special "building law," that the term itself, strictly speaking, is a misnomer, being simply a convenient designation for the group of cases in which the general rules of law have been applied to building contracts and kindred questions, is the first thing to be grasped by every one whose calling makes it important for him to become familiar with the principles of law which govern these matters.

An attempt will be made in this department to present in a concise form the legal principles which it is important for architects to know, and which, for the reasons given above, it is difficult for them to ascertain. It is hoped that this work, supplemented by answers to correspondents and by some discussion from the legal standpoint of other matters of general interest to architects, will meet with the approbation of our readers and of the profession generally.

COMMUNICATIONS

COMBUSTIBLE ARCHITECTURE AGAIN.

BOSTON, MASS., January 22, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Under the title of "Church Vestry Destroyed," the Boston *Herald*, under the date of Monday, January 21, gives an account of the destruction of the vestry belonging to the old Cambridge Baptist Church, which was a large and expensive structure, purporting to be built of stone. The firemen on reaching the fire "found the whole roof of the vestry blazing," and with great difficulty the fire was prevented from penetrating the hollow roof and the hollow walls of the main church, which was barely saved.

The cause of the fire is said to have been a defective flue; this may be a very good guess, but one who has studied the frequent combustion of this class of buildings may venture to guess that during the variable weather of last week the furnace was lighted when the church was very cold, and when the outer air became warm, back action may have taken place through the furnace air-box, probably made of wood, setting the floor and hollow wall of the vestry on fire; the fire being immediately communicated to the roof, where there was a space of four feet between the ceiling and the roof proper.

A loss of twenty thousand dollars and four firemen injured is the price paid for this example of combustible architecture. I think this is the third instance of similar fires in Cambridgeport in recent years. In the previous case, a second church upon the same spot where the previous one had been burned, having been destroyed in the same way, I ventured to recommend, under the name of "Ignis Fatuus," that the Building Committee should advertise for a *safer* method of combustible architecture, which should ensure the very prompt combustion of the church itself without exposing the firemen to danger. Whether or not this plan was followed in the building of the church for the third time I am not informed.

I venture at this time, in the light of the fire, to send you three studies for slow-burning churches, houses and hospitals which may serve a useful purpose in calling the attention of the public to the usual faults in construction of this kind. These buildings are out of our customary line, but since we have been obliged to refuse to insure a Memorial Church, belonging to the owners of some very large cotton factories which we *did* insure — owing to its faulty construction — we thought it might not be inconsistent to give our members some hints, so that they might construct safe memorial churches, or other buildings appurtenant to their factories. We submit these sketches merely as studies, for what they are worth.

Yours very truly, EDWARD ATKINSON.

SUPERINTENDING WORK AT A DISTANCE.

SEATTLE, W. T., January 18, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I have a work to design and superintend, to cost $200,000. It is located at Seattle, W. T., while my home and business is in New York. I cannot give it personal supervision, and must have the superintendence to a deputy. There is one of strict experience who offers his services at $2,400 a year. The price is moderate; he surely should be worth that if he is efficient for the service, while the payment — if so large a building is as long in construction as usual — will probably more than eat up the entire commission allowed me for supervision. This I should not at all object to, but here enters another feature: as my representative, I am responsible, minus all compensation for responsibility for him, and if — as in the case of a hotel at Kansas City, where I understand a truss at the top of the building slipped and landed in the cellar, causing several thousand dollars loss, and where combined with the contractor, the architects — though their plans were faultless, were held for the mishap because they were the superintendents — if, I say, such troubles should arise in my work, where would I stand? And what safeguard, if there is any, could I provide to eliminate this unjust element of risk?

It has seemed to me that the owners have a distinct right to look to me to perform for them all the duties of an architect; but ought not I also to have some provision by which I can sleep in security while my work is going forward?

Any suggestion that can help me to adjust this business on a proper and if possible, a safe professional basis, will be greatly appreciated by. Yours respectfully, VITRUVIUS.

[We should say that "subscriber's" best way would be to furnish drawings and specifications for the building, receiving for them the usual commission for such limited service of three and one-half per cent, and have it understood that his responsibility ends then and there, the owner providing as he may see fit for the carrying out and supervision of the work. If the owner wishes to have the architect superintend the building, the only fair way would be to pay him for the time, as well as the money, expended in traveling to and from New York, the *frais de déplacement*, as the French law calls it. To expect the architect to keep a deputy on the ground, committing his fortune and his professional reputation absolutely to a stranger, simply because the owner does not wish to pay the reasonable cost of having the architect himself see to the work in which he has so heavy a responsibility, may seem right to an owner, but it hardly will to any one else; and no architect who would take so grave a risk deserves no sympathy from the profession. — EDS. AMERICAN ARCHITECT.]

PIPING A HOUSE FOR GAS.

NEW YORK, January 26, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The complaint of "Sinex" is most interesting, and we hope it will provoke discussion. No part of the construction of a building, of equal expense, is more important, and none so universally neglected by both owners and architects, as the gas-fitting. During an experience of more than twenty-five years' gas-fitting, lighting many thousands of country buildings of all classes, we have hardly ever seen specifications furnished by either architect or owner which would furnish reasonable direction to the gas-fitter, or afford any protection to the owner.

We have men employed nearly all the time in taking out piping from houses imperfectly piped, and doing what may be done to rectify inferior work. During the last thirty days we have found three buildings in the suburbs of New York in such a condition that it was dangerous to turn the gas into them. Removing, at great expense and annoyance to the owner, oak floors and wainscoting, tearing off decorations, and in some instances removing clapboards from the outside of houses, we have found every rule of the trade violated — split pipe, fittings full of sand-holes, joints so loosely put together that they may be swung around by hand, pipe of insufficient capacity, drops taken out from the bottom of running lines, bracket-lights run from overhead instead of from below, and drips carrying a condensation into fixtures, instead of into risers and out of the house.

How may these difficulties be avoided?

First, let "Sinex" pay what the work is worth.

It is safe to say that no house to which even the smallest gas-machine made would be attached can be honestly piped for thirty dollars. No gas-fitter ought to consent to pipe any house for less than fifty dollars. In a matter of so much importance, and where the cost is so trifling, why should not the owner, selecting tradesmen of financial responsibility and known skill, order the gas-fitting done by the day? Why invite dishonest work by asking, in a general way, for bids from anybody and everybody, without providing, first, suitable specifications for the work, and, second, insisting on a certificate signed by an inspector known to be competent? We have furnished printed directions and specifications in detail for the piping

of suburban buildings suitable for gasolene-gas for many years, and have distributed thousands of them to architects and owners without charge, but have never in a single instance seen one of them used.

So long as owners and architects are so singularly and conspicuously indifferent to the character of work done, how can gas-fitters and plumbers be expected to care.

Probably "Sines" got more than thirty dollars' worth of work in the case he complains of.

Gilbert & Barker Manufacturing Company.

THE CHURCH OF GAUDALUPE, MEXICO.

Hartford, Conn., January 22, 1889.

To the Editors of the American Architect:—

Dear Sirs,—Some of your readers may be interested to know that the massive frame surrounding the "miraculous" picture of the Virgin in the centre of the high altar of the church at Guadalupe, published in last issue, is of solid gold, and was given by a wealthy merchant who had been, it is alleged, benefited by the Virgin's interposition in his affairs.

The double balustrading reaching down from the altar to the organ in middle of nave is of solid silver.

The frame, I am not able to vouch for, but, while I was at the church a few months ago, the organ was undergoing partial removal and I inspected the railing, and found it cast hollow, with a shell one-quarter inch thick, apparently of pure silver throughout.

Silver is not dear in Mexico, and in the thin, dry air preserves its brilliant lustre a long time without repolishing.

In this church of Guadalupe are hung numerous effigies in silver of portions of human bodies which have been healed by the Virgin's miraculous powers. Yours very respectfully,

Melvin H. Hapgood.

NOTES & CLIPPINGS

A "Close Call."—One of the worst frightened men in Fall River, Mass., recently, was Alderman Durfee. He happened to be standing on a ledge of rock from which building stone was being quarried. Everything was quiet, but he finally noticed a man crawling towards him cautiously on his hands and knees. The alderman naturally inquired why this was being done, and was informed that for the past ten minutes he had been standing on top of a dynamite cartridge, and that the crawler had been trying to set it off by means of an electric wire. The alderman's heel was upon the wire and had grounded it, and that was the only reason why the blast did not go off.—*Fire and Water.*

Brick Foundations.—Mr. H. Leonard, M. I. C. E., the late chief engineer to the Bengal Public Works Department, gives in *Indian Engineering* an interesting account of experiments carried out by him at Akra with a view to determining the proper proportions of brick foundations in alluvial soil. The experiments were made on a large scale, the piers being of a size such as might be used in real work, and the indications obtained are correspondingly valuable. First, with regard to the pressure permissible, Mr. Leonard found that with a pressure of one ton per square foot on the soil there was practically no sinking, whilst with two tons the sinking was decided, and sufficient to cause bad cracks. If one part of a building were built with a pressure of two tons per square foot on the foundations, and another part with one ton only, the unequal settlement would be, he considers, quite sufficient to cause bad cracks; hence the load on the foundations should be under one ton per square foot, or it over should be equal on all the piers. Experiments were next made on the proper depth for the foundations. Trials were made with foundations at two feet, six inches, or just below the usually disturbed soil, at four feet where the true alluvial deposit was undisturbed, at eight feet where a different though not better soil was touched, and at eleven feet where the soil was soft and wet. The foundations at two feet six inches were found to be affected by heavy rains, whilst those at eleven feet sank more than those at four feet and eight feet, and Mr. Leonard finally concludes that in undisturbed alluvial soil the foundations of important buildings should be laid at a depth of between four feet and six feet. The third point examined was the proper spread to give the brickwork in such soil, and from these experiments he concludes that for a pressure of one ton to the square foot in Bengal soil the thickness at the toe of the slope should not be less than one foot six inches and the stepping at an angle of not more than forty-five degrees.—*Engineering.*

Flexible Foundations.—The ordinary conception of a foundation is that its virtue is in exact proportion to its rigidity, and that the more unyielding it is, the better it serves its purpose. And while this assumption may be true in supporting a heavy load, yet where questions of impact enter, the "soft answer will turn away wrath," as well in dynamics as in polemics. At a factory in the United States some bevelled gears which were used to change the direction of main shafting from one mill to another, were at the end of very heavy shafts, which ran in pillow blocks, simply bolted to an outcropping ledge, which was dressed to a level for the purpose of sustaining the foundations. Some of the teeth of these bevelled gears would break from time to time, and in a most unaccountable manner. The accident might be deferred for three months, or it might occur at any moment. Various expedients were tried, and finally that of taking up the pillar blocks and placing them on seats of raw hide which had been soaked in oil; these gave the bearings enough elasticity to prevent a concentration of shocks upon the teeth of the gear, and in that way acted as a buffer preventing the gears from committing a mechanical suicide. A steam engine, used to operate the dynamos for lighting an insurance building in New York, gave a great deal of annoyance to the occupants by the jar which was transmitted throughout the building. It is supposed that the motion of the engine was in rhythm with the key-note of the building. The makers of several engines tried to solve the problem, which was at last achieved by one firm, who bolted the bed of their engine to a timber raft which rested upon a layer of hair felt such as is used for non-conducting coverings for steam pipes and boilers, but fourteen inches thick. This felt was placed upon the masonry foundation recently prepared for the engine, and surrounded by a heavy timber box which prevented its spreading. An engine, used to operate the electric-light plant in one of the principal hotels in New York City, gave annoyance to the guests because, when it was in operation, beats could be heard all over the building, notwithstanding that the engine was situated in a tightly-closed room in the basement. After various other expedients had failed, the doors to this room were taken down and replaced by double thicknesses of carpet fixed upon the framework. This served to break up the rhythm in such a way that the sound was not heard throughout the building. Sawdust has been used for foundations in many instances, and there are numerous towns in the United States which have been built up from small villages originally around a sawmill, and the sawdust from the mill has been used to fill up low places which have afterwards served as building lots. In course of time such filling becomes very compact, and does not appear to waste by decay.—*Engineering.*

TRADE SURVEYS

The combination of electric-light interests which has been long under discussion has been finally partially effected by the United States and the Westinghouse uniting. These companies will control some 700 patents and represent a capital of $10,000,000. The manufacturing capacity at present is 15,000 lamps per day, and new works will be erected at New York and Pittsburgh to expand production to any desired limit. The unification of interests is significant in many respects. It means, among other things, that a good many patents that have heretofore been unused will hereafter be developed, and that a great deal of work will be prosecuted which it was to the individual interest of the companies to hold in check. While this is in the form of a monopoly, it is one of these combinations which will naturally result in much good. It is probable that the cost of electric lighting will decline rather than increase. The reports from the leading companies all over the United States all speak of an unusually active condition of business. During the past ninety days more business for electric-light conveniences have been received and ordered, it is stated, than during any previous twelve months. Manufacturers of machinery of all sorts of equipments and supplies are now crowded with work, and this condition of things is not likely to be changed by any decadence of demand for an indefinite period. The demand for electric-light goods from all sections of the country, from small towns in the far West and Southwest, as well as from the larger cities is large. The activity in electrical circles is a fair sample of what is going on in many other directions. The projectors and promoters of industrial enterprises are entering upon their new work for the coming season. A resumé of the extensive operations projected during the past thirty days may be presented in the compass covering almost every kind of manufacturing enterprise. Throughout the South, cotton-mills, agricultural implement works, wagon-factories, rolling-mills, blast-furnaces, besides innumerable small manufacturing establishments, are all projected for constructions as soon as material can be had. Louisville will become quite a manufacturing city if all the schemes right are projected are carried out. Mississippi has already made wonderful progress, and several large companies are now preparing to operate in that State, in railroad construction, in the establishment of ship lines, in cotton-mills, in lumbering operations and in many others. A great deal of money will be invested in Northern Alaska this year, and four or five long lines will be constructed, the others of fifty miles in length.

Along the Atlantic coast numerous enterprises are talked of, most of them the property of Northern capitalists. Late advices from Kansas City, Omaha and Minnesota show that indications from those centres can be relied upon as general that there will be larger building operations undertaken this year than last. One reason is that last year's investments have been unusually profitable, another is that the country is filling these localities and that the country is being developed. Omaha is becoming a very important commercial centre and important railroad schemes will make that a sort of centre. Besides this, numerous small manufacturing enterprises are springing up in Montana, Colorado and Utah and they are drawing capital and enterprise to their aid. In Minnesota, St. Paul, Duluth and that region of country, those who will make investments as the railroad situation clears are waiting. The solution of the railroad question will cause a great many difficulties in the way of farmers, miners, lumbermen, and the copper-mining interests as well as the agricultural and commercial interests and the paper interests of this wonderful section. Not one single branch is threatened with restriction. Enlarging operations will probably be reported within ninety days in every branch. The leading lumber authorities are predicting an improving trade and are intending to prepare for it when it comes. In New York City there is a growing accumulation of money. The surplus there is now in excess of $20,000,000. This is an encouraging thing just now. Financiers are pleased at the manner in which borrowers are repaying their loans everywhere. Very few failures are taking place. The great bulk of obligations are being promptly met. Bankers find but little demand for money, yet it must be remembered that there is an increase in the amount of business that is being done by the use of negotiable paper. Business men are interested in keeping as near to the cash system as possible. Bankers themselves are disposed to favor an increased supply of money to meet the enlarging business operations, but they are not willing that it should be issued otherwise than under the supervision of banking interests whose business it is to measure the requirements of the country, so far as money is concerned and to meet that demand. The railroad question is generally gliding toward a quiet solution. Two or three meetings have been held within ten days and the serious obstacles which them taxed the patience and ingenuity of the most experienced railway managers for years past are now likely to be adjusted.

S. J. Parkhill & Co., Printers, Boston.

CABOT'S ANTI-PYRE

Ye defeate of ye moderne Apollyon

With this material wood-work can be thoroughly protected from fire at a cost of less than one cent per square foot.

It can be had in all colors at 30 cents per gallon.

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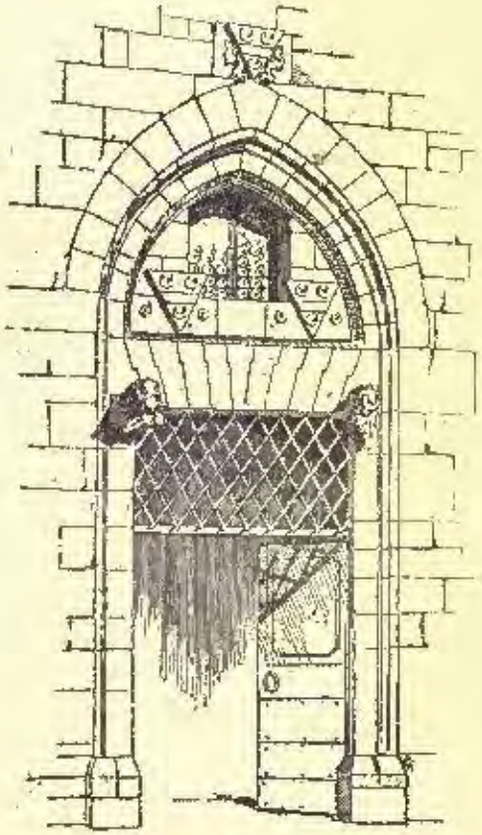

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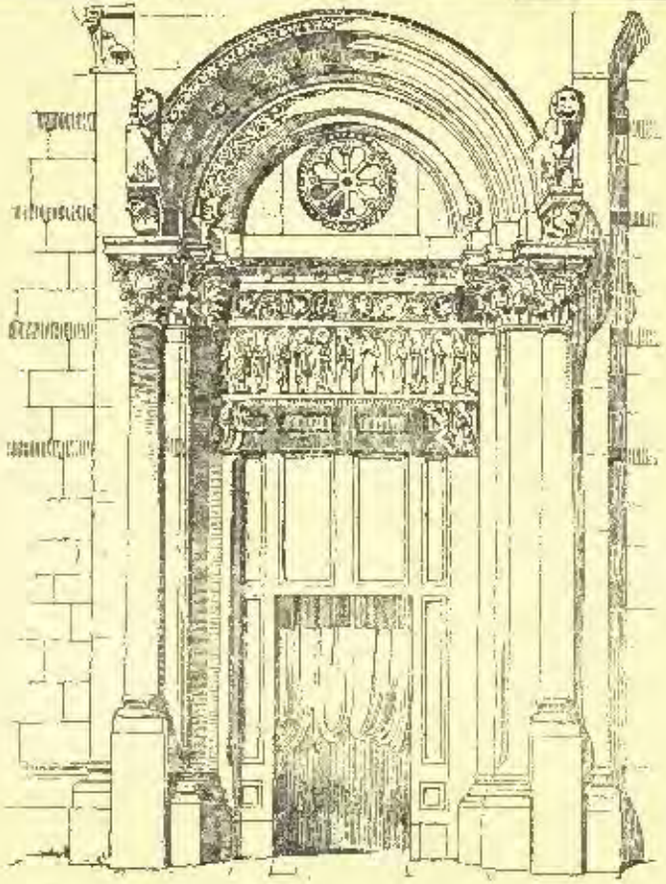

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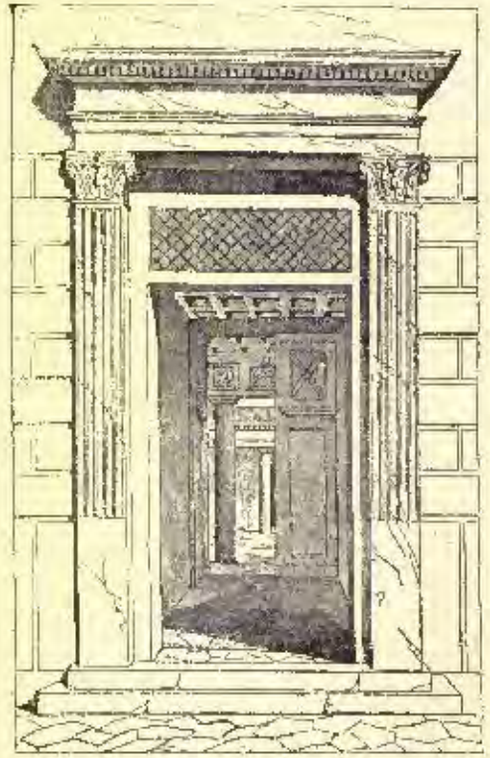

FROM THE HOUSE OF PANSA, POMPEII.

DOORS & DOORWAYS.

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Vol. XXV. Copyright, 1889, by Tichnor & Company, Boston, Mass. No. 685.

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Entered at the Post-Office at Boston as second-class matter.

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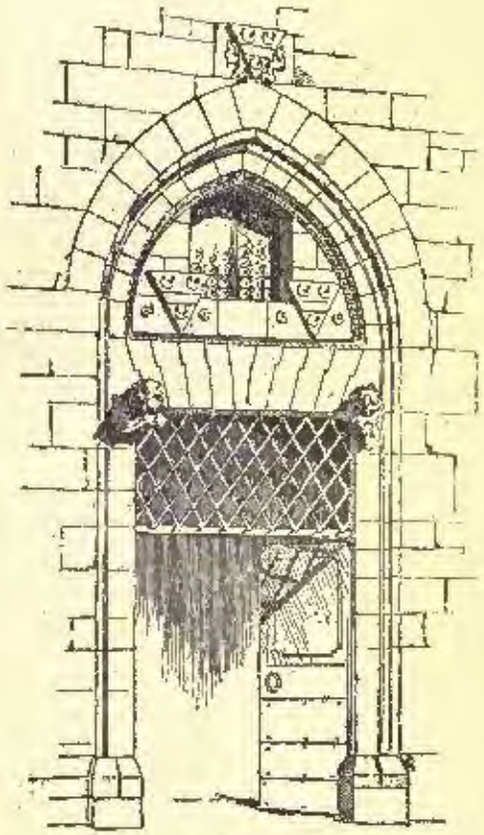

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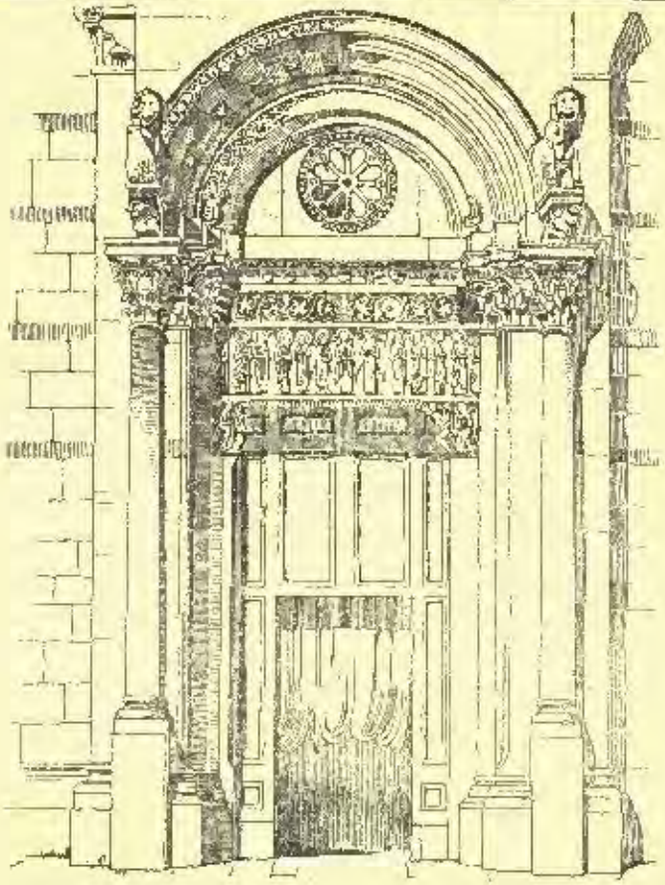

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A CASE involving a principle of great importance to architects was recently decided in the Court of Common Pleas in New York. A well-known architect, Mr. Hubert, brought suit to recover the value of his services from a client for whom he had built an apartment-house. The client, Mr. Aitken, claimed an offset of one thousand dollars from the bill, on the ground that "the area of the flue provided in the chimney was inadequate for the service of the boiler, so that the proper consumption of the coal could not be secured," and that he would, in consequence, be obliged to build a new chimney-flue on the outside of the building, the "necessary cost and expense" of which would be a thousand dollars, as claimed. It was proved that the architect asked the contractor for the steam-heating about the size of the flue he needed, and that the flue was built according to his instructions, but the court held that the architect, not the steam-heating contractor, was responsible for the failure of the latter to know his own business, and that the architect must pay the thousand dollars claimed. We presume, from a somewhat extended acquaintance with such cases, that there is not the slightest probability of the new chimney being built, and that the owner, after he gets through chuckling over the ingenious device by which he transferred a thousand dollars from an architect's pocket to his own, will find that the old flue really answers very well, and that it is hardly worth while to annoy his tenants by making any changes, and so on. The fact is, as every architect who has studied the subject knows, that not one flue in five hundred for boilers devoted principally to heating is made of the dimensions required for the "proper," that is, the economical con-

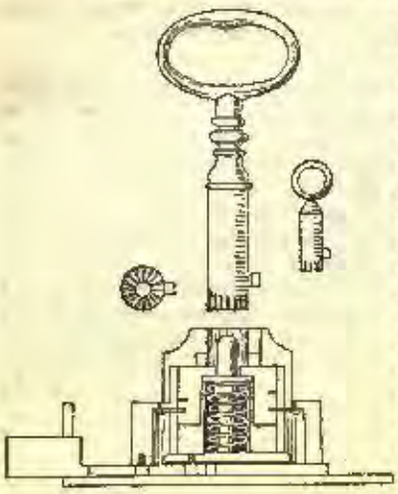
sumption of coal. The obvious reason for this is that, if the dimensions of the flue are calculated by the rules of proportion to grate-surface used in designing the chimneys for power-plants, where economy of coal is of the utmost importance, the owner, when he sees the plans, is horror-stricken at its size. To his mind, it appears to block up most of the rentable portion of his building, and he flies to a steam-heating contractor, who soothingly assures him that a twelve by sixteen flue, or even an eight by twelve, in case of need, will do very well, and, as is probably true, that he has often utilized the latter for boilers where nothing better was to be had. Nothing is said then by either party about the "proper consumption of the coal," and the indignant owner, after relieving his feelings by going about among his friends and denouncing his architect as a "crank on the subject of flues," and warning them to have nothing to do with him, comes back to the office and requests that the matter may be left entirely to the judgment of the heating-contractor, who "guarantees the results." In most cases this ends the matter; the boiler works as well as house-heating boilers generally do, and the owner congratulates himself ever after on his good fortune in having headed off the architect in time to prevent him from spoiling the building with his huge chimney. In the five hundredth instance, perhaps, the owner, aroused, as many persons are, by the presentation of a bill to an inquiry after pretexts for not paying it, bethinks himself of his chimney-flue, and the unfortunate architect then finds that the law, at least in New York, does not allow him "to shelter himself behind the heating-contractor," although it gives the heating-contractor admirable facilities for hiding behind him, and that he must pay not only for a new chimney, but for the consequences of any other error of judgment that the heating-contractor may fall into in regard to his own guaranteed work.

If this doctrine, as we deduce it from the report which the *Engineering and Building Record* gives of the case, were often acted upon, the practice of architecture would soon be abandoned, and owners and steam-heaters would have to grapple with each other directly, instead of both healing the wounds that each chose to fancy the other had inflicted by helping themselves to balm out of the common reservoir, the architect's pocket; but even the possibility that an occasional individual may try to take advantage of it acts as a continual menace to the profession. We shall leave comment upon the legal aspects of the case to other hands, but, from the point-of-view of practising architects, we cannot help feeling how serious a misfortune it is that such a case as this could not have been taken up by a powerful protective association and carried, if necessary, to the Supreme Court of the United States, so that the law might be settled, once for all, and the professional conduct of such matters shaped accordingly by unanimous action. As we all know, most steam-heating contracts include a guaranty that the work, if carried out according to the proposal made, shall be efficient and satisfactory. As this guaranty is a serious matter for the contractors, they usually seize any interference or direction of the architect as a pretext for withdrawing it, reserving their right to complete the contract without it. It is needless to say that work done on a heating-contract under guaranty seldom fulfils the guaranty when first completed, and is only brought to conformity with it after several successive struggles, while work done on such a contract after the guaranty had been withdrawn might safely be warranted not to do anything that was required of it; so that architects are very careful to avoid giving any advice or instructions that might be tortured into an interference with the contract. In the light of this decision, however, it appears it is the architect who furnishes the guaranty in all cases, while the steam-heater gets the money. If the architect meddles in any way with the latter's method of carrying out his contract, the guaranty clause of the contract is immediately withdrawn, the work, when completed, proves inefficient, and the owner pays the contractor in full, and requires the architect to put in new heating-apparatus at his own expense as a penalty for interfering with the contractor's operations. If, on the other hand, the architect refrains from giving any directions, so that he may be sure of being able to enforce the guaranty clause of the contract, the owner, if his heart is tender toward steam-heaters, or he gets tired of waiting for the guaranty to be fulfilled, has only to pay the contractor in full and lay hands on the architect, who will be informed by the court that "Responsibility cannot be shifted in that way," and will be compelled, as before, to put in new heating-apparatus at his own expense as a penalty for *not* interfering with the contractor's operations. It may be that this is the law, which, according to the highest authority in England, is quite a different affair from justice, but we are willing to entertain a doubt on the subject.

While we are considering the subject of heating contracts, and the sort of guaranty that the manufacturers of heating apparatus are supposed to give with their goods, we may draw a lesson from a letter addressed to the law editor of *La Construction Moderne*. The writer of the letter, an architect, says that one of his clients, who had just opened an ice-cream saloon in a new building, began to think, on the approach of winter, of means for warming his room. He wrote to an establishment in Paris for suitable apparatus, and the Parisian firm sent a representative, who examined the chimney flue, and, on the arrival of the heating apparatus, set it up, ready for use, and left it. The new owner, however, found, on taking possession of it, that it would not heat the room, and that a fire would hardly burn at all in it. He complained to the Paris manufacturers, who altered and lengthened the chimney, until, as they said, everything was in proper order. The new arrangement proved no better than the old, but it was hardly possible to make any change in the middle of winter, so the proprietor endured the cold, as best he might, until spring. He then went to the manufacturers, and described his condition at length. They offered to take back the original stove, and put in a larger one; and the proprietor agreed to this, but, on returning home, he reflected that the new stove, which would be six feet high, and nearly a yard in diameter, would be anything but an ornament to his room, and he telegraphed back the same day to the manufacturers, declining the proposed arrangement, on the ground that he had concluded to have a furnace put in the cellar by a local contractor. The Paris firm replied, offering to take back the unsatisfactory stove, on condition that they were employed to build the new furnace; but the saloon-keeper thought he had had enough of their goods, and went on with the local furnace-man, who put in a perfectly satisfactory apparatus. Meanwhile, the original stove had been shipped back to the manufacturers, who simply acknowledged the receipt of it, mentioning that they had put it in storage. All this part of the transaction took place in May, and the saloon-keeper, who had paid forty dollars on account for the unsatisfactory stove, probably thought that he had paid dear for a disagreeable experience. Seven months later, however, in December, the Parisian manufacturers sent a demand for the balance of the price of the rejected stove, amounting to forty-four dollars, together with a bill for storage, and another bill for the price of the larger stove which they had agreed to furnish in place of the unsatisfactory one, but which had been countermanded by telegraph, less an allowance for its return.

The saloon-keeper, who thought in paying half the price of a guaranteed apparatus, which had turned out perfectly useless to him, and had been returned in good order to the makers, to be sold to some one else, he had done all that could be expected of him, applied to his architect for advice in regard to the new demand, and the architect applied to the law-contributor of the journal, M. Ravon, who replies unhesitatingly that the Parisian manufacturers are technically in the right, and that the saloon-keeper will have to pay the bill. In France, as here, although a furnace-maker is presumed to guaranty the proper working of an apparatus which he sets up, he must be allowed all reasonable opportunity for making good his guaranty, and the fact that the apparatus fails to do what it was warranted to do must be clearly established before expert and impartial witnesses. In this case the proprietor had refused to allow the manufacturers to make good the deficiency in their apparatus by substituting another, and he had not called in experts to establish its defects, but had taken the law into his own hands by sending back the stove with nothing but his own assertion that it was useless to him. The manufacturers, on the other hand, had proceeded cautiously and legally. On being notified that the stove was unsatisfactory, they had twice offered to replace it, first by a new stove, and, secondly by allowing its price toward that of a furnace. On the rejection of these offers, and the return of the stove, they had promptly given notice that it was received only as the saloon-keeper's property, to be stored at his expense, and like most people who prefer legality to abstract justice, they had come out of the affair with all the winning cards in their hands.

BUILDERS' HARDWARE.[1]—XVIII.



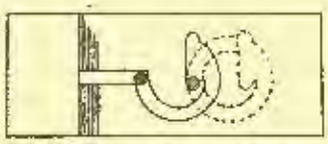


Fig. 291. The Bramah Lock.

IT has not been the intention to consider in detail any articles of hardware which are not in actual daily use at the present time; but there are a few styles of locks which are entirely obsolete so far as the American trade is concerned, but which should be included in any study of the subject, if one wishes to thoroughly understand the principles of modern lock-making, and the processes of elimination and survival of the fittest which have brought the manufacture to its present state in this country.

Figures 291 and 292 illustrate the old "English Bramah" lock. This consists of a revolving cylinder in which is disposed radially a series of flat sliders working up and down through slots in a fixed horizontal plate. The sliders have notches on the outer edges, cut at different heights, so that the cylinder can revolve only when the notches on the sliders are on a line and level with the plate. The sliders are forced outward by a single central coiled spring. The key consists of a tube, on the sides of which are straight grooves corresponding to the desired depression of the slides, with a shoulder to turn the cylinder. The locking-bolt is moved by an eccentric attached to the cylinder. The notches on the sliders are disposed as irregularly as possible, and false notches are added, with corresponding false widenings of slots in the plate. All of the sliders can be pushed in farther than is needed to bring the notches on a line with the plate, so that the lock is picked with great difficulty.

"Cotterill's" lock, Figures 293, 294 and 295, is another example of English ingenuity. The portion which is acted upon by the key consists of a rotating flat disk or cylinder containing ten or more slides moving in radial grooves and pressed

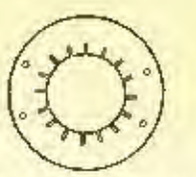


Fig. 292. The Locking-plate of the Bramah Lock.

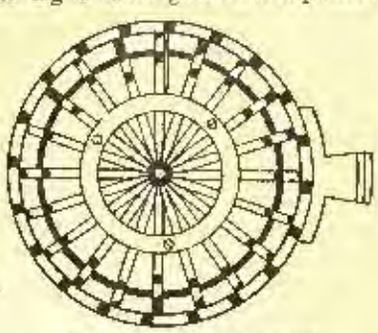


Fig. 293. Plan of Cotterill's Lock

towards the centre by springs. A fixed ring or plate is fitted to a circular groove on the face of the disk, and has slots corresponding in position to the radial slides. There are also grooves cut on the edge of the slides, so that when the key is in place the slots on the slides coincide with the circular groove on the disk, permitting the whole to be revolved. When the key is withdrawn the slides are forced in different degrees towards the centre, so that the solid portions intercept the groove in the disk, in which position it is held fast by the fixed ring. It is believed that this lock never has been picked.

A lock which in its time was a strong competitor with "Bramah" and "Cotterill's" locks, and was equally impregnable, is "Day and Newells" Parantopic bank-lock, an American invention which was in great demand at one time, but has long since ceased to be manufactured. It has the curious property that the key, which is made with movable bits, can be changed at will, so that the lock can be opened only by the key which was last used to shoot the bolt. The lock has never been picked. Figure 296, which is taken from *Price*, is too complicated to fully illustrate the workings. Figure 296*b*, while not exactly like the lock, embodies the same arrangement and will serve to make the construction understood. The letters refer to both figures. There are three distinct sets of levers, *A*, *B* and *C*, each admitting of a sliding or

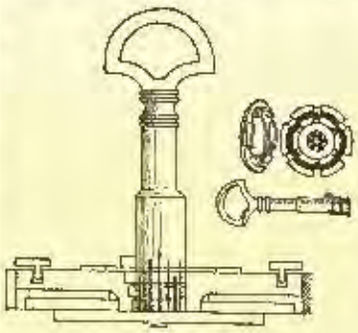


Fig. 294. Section.

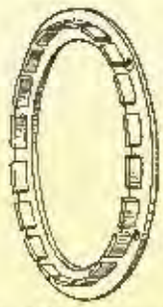


Fig. 295. Locking-plate.

lifting motion up and down, the levers *A* having springs which keep them pressed down, *D*, and the levers *C* being constantly forced up by a spring of lesser strength *E*, so that the levers *C* will always move up and down exactly as *A* are raised or lowered, the tops of *C* bearing against the bottom of extensions to *A*. The levers *B* have no springs, and slide up and down between studs attached to a wing of the bolt-tail, so that when the bolt is shot, the levers *B* move with it. *F* is a dog

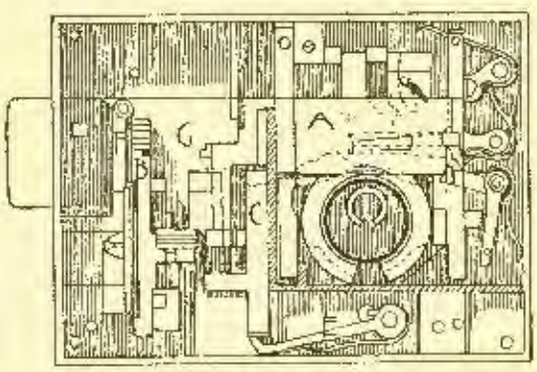


Fig. 296. Parautopic Lock.

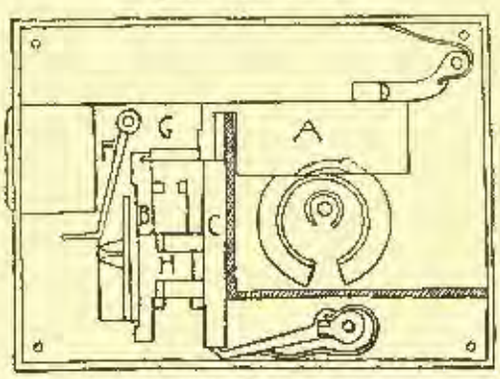


Fig. 296*b*. Parautopic Lock.

or lever, which is hinged to a stud on the bolt at the top, and hinged with a bent elbow attached to the lock-case at the bottom. On this dog, *F*, is a tooth, and on the edge of each of the tumblers *B* are notches corresponding in mutual distance with the difference in lengths of the movable bits of the key. Furthermore, the levers *A* are each made with an arm *G* which fits into a corresponding notch in the levers *B*, and the levers *B* have each an arm *H* which exactly fits between two arms on each of the levers *C*. Figure 296 shows the lock with the bolt thrown, and Figure 296*b*, shows it drawn back. When the key is turned in the lock, the bits, no matter in what order they may be arranged, lift the levers *A*. These, by means of the arms *G* and *H*, lift the other sets of levers in exactly the same proportion. The key then forces out the bolt, and the levers *B* are withdrawn from the arms *G* and *H*, but before the arms *H* are entirely free from the arms on the

[1] Continued from page 54, No. 684.

levers *C*, the notches on *B* are caught on the tooth of the dog *F*, the levers *B* being then held at exactly the relative heights to which they were raised by the action of the key on levers *A*. The key, continuing to turn, then allows levers *A* and *C* to drop to their original position, and the bolt is then locked. It is evident that only the proper key will answer to unlock the combination, as unless the levers *A* and *C* are raised in exactly the proportion they were when the bolt was shot, the arms *H* cannot enter between the arms on levers *C*, and the bolt cannot be moved. There are several other features of the lock, such as detector plates, wards, etc., which need not be noticed here. A circular curtain protects the keyhole, and a solid partition entirely prevents access to the levers, while if any attempt is made to discover the combination by applying pressure to the bolt and tentatively rising the levers *A*, the arms on the levers *B* and *C* which have notches on the ends will catch on each other and be immovable as long as the pressure remains on the bolt. With an eight-lever lock and eight-bitted key, over 5,000 different combinations can be made.

A very ingenious idea which seems not to have survived the the test of years was embodied in another English device — "Parnell's" Defiance lock. The peculiarity here is in the key, which is made with expanding bits. When out of the lock it has the appearance of a key-blank. Eccentrics in the lock force out the proper bits to act on the levers, and the keyhole is guarded in such a manner that a key which could enter and was without expanding bits, would simply turn without affecting the lock; whereas a key with fixed bits which would be right to move the levers could not enter the keyhole.

As previously stated, none of the foregoing are now used in this country, but from them several of our best locks have been derived. Prior to 1851 all of the best locks used here were of English make, but from causes which will be explained in a subsequent chapter, American locks came to the front about that time, and to-day an English lock would be looked upon as a curiosity in our hardware trade.

Turning then to our own current manufactures, there are several varieties of locks which are commonly found in the market. The "dead-lock" consists simply of a bolt thrown by the action of the key on the levers, but does not include any knob or latch. A "mortise lock" is one which is mortised into the frame of the door, and always includes, as commonly understood, both bolt and latch. A mortise lock is generally operated from either side. A "rim-lock" is one that is planted on the face of the door. It is generally made with a nicer-looking case than the mortise locks, and requires longer keys and a little different adjustment of the knob-spindles. A dead-bolt may be either mortise or rim, but, generally speaking, rim-locks are understood to have both latch and bolt. A "rebated lock" is one which is mortised into the door-frame like an ordinary mortise lock, but the face-plate is rebated so as to fit the rebates of the door to which it is attached. This form of lock is used only for front double-doors. In the East it is customary not to rebate the front doors, but, we believe, generally speaking, in the West such locks are necessary. Special locks are usually made for front and vestibule doors. The lock for the front door includes a dead-bolt and a latch operated by a knob from within, and worked by a key from without. The vestibule lock consists simply of a latch worked by a knob from the inside and a key outside, the same night-key answering for the latches of both front and vestibule doors. Hotel locks are understood to be those which are so arranged that they can be opened from either the inside or the outside, but when locked from the inside cannot be unlocked from the outside. There are many varieties of hotel locks. Generally they are made in sets of fifty, one hundred, two hundred, or more, as desired, and are master-keyed, that is to say, the tumblers are so arranged that one key will unlock the whole series, though the individual keys of the different locks will not unlock each other. Again, they are sometimes made so that the lock can be locked from the inside with one key, and an exactly similar one can unlock it from the outside, but the master-key cannot unlock it after the bolt has been thrown from the inside, and after the bolt has been thrown twice from the inside nothing can open it from the outside. Such locks are intended to be used where two persons room together, but do not come in at the same hour, each wishing to be secure against intrusion, and yet leave the lock so it can be opened by his comrade.

Locks are made both by hand and by machinery. Boston, at present, seems to lead the country in lines of hand-made locks. Indeed, it is doubtful if in any other city such an industry could so long survive the extended application of machinery to labor which has so strongly marked this century. But in Boston the old ideas are slow to go, and the people are loath to give up a thing once tried and proved, merely because there is something else in the market, even though the something else may be cheaper. There is no question but that a hand-made lock, if the manufacturer is thoroughly conscientious, is better than one made by machinery, especially as the hand-made lock manufacturers, thus far, never have catered to a cheap trade, and have always kept their goods up to the very highest mark. In the hand-made locks the levers are carefully adjusted, nearly all the interior fittings are made of brass, and, while in some respects hand goods may be inferior in fineness of polish and smoothness of exterior appearance, no one ever denies their excellence. But, on the other hand, the cost of hand-made goods is so much higher than those made by machinery that the former are gradually being driven out of the market, especially since some of the best of the machine-lock manufacturers have succeeded in turning out such admirable goods. To the uninitiated the best of the machine-made locks are quite as good as any that are turned out by hand, while the progress of machinery has been so great that it is possible to obtain almost any desired accuracy of adjustment. Of course, the best of locks, even those which are nominally machine-made are fitted by hand. Only in the cheapest forms are locks left as they come from the machine.

In regard to price, machine-made locks may be divided generally into six classes. This division, of course, is not absolute. Locks are made in all grades, and are of all prices. Some very good locks are made in cheap form, and some very poorly designed locks are listed at a high price; but for general comparison this division will be satisfactory: —

First, the cheapest form of lock made, with iron face and bolts, steel spring, and a single lever; P. & F. Corbin have a lock of this description which sells in the market for a $1.50 a dozen.

Second, a lock with brass face and bolts, all the rest of the construction iron, one lever; average price $4.00 to $4.50 a dozen.

Third, brass face and bolts, all the rest iron, with two levers; $7.00, or with three levers $8.00 per dozen.

Fourth, anti-friction latch, brass face and bolts, three levers, $17.00 per dozen.

Fifth, front door lock and latch, $1.50 to $4.50 each.

Sixth, hotel locks, $2.50 to $5.00 each.

Hand-made locks may be divided according to cost into five classes: —

First, single lever with brass face and bolts, $1.50 each.

Second, three levers, brass face and bolts, $2.50 each.

Third, anti-friction strike, three levers, brass face and bolts, $3.00 each.

Fourth, anti-friction strike, all brass-work, $5.00 each.

Fifth, front door locks from $8.00 up.

The foregoing classification of machine and hand-made locks according to price does not imply two classes in regard to either efficiency in working or nicety of plan. The machine and hand-made locks are designed on exactly the same principles, and the differences are but slight. Still the hand-made locks are, throughout, better than a relatively corresponding grade of machine-made locks.

(To be continued.)

Duty Paid on a Pharaoh. — An absurd instance of the length to which the policy of protection is carried out by French *douaniers* was told the other day by M. Maspéro to some friends. He had brought back from Egypt a royal mummy. Of course the case had to be opened at Marseilles. Being told it contained a Pharaoh, the officer looked up "Pharaoh" in the tariff; but, as it was not to be found, he decided that Pharaohs, being an article of which there was no mention, should be taxed according to the highest scale. So M. Maspéro was made to pay as for dried fish. For years an English mustard had been imported and the ordinary duty on mustard charged. However, the French customs one day decided that the mustard contained flour and should be charged a higher duty. On a further analysis a homœopathic quantity of an ingredient not in the tariff was found, and so the mustard was held to fall under the heading of unspecified spices," and accordingly a duty of 24s. a hundredweight is now payable on thirty-shilling mustard. Pickles are called in the French tariff "conserves au vinaigre." Last year, however, it was discovered that pickles mostly contained ginger or cloves or cayenne paper, and pickles were forthwith subjected to an extra duty. — *London Daily News.*

AUGUSTE RODIN, SCULPTOR.[1]—III.

"Ugolin." A. Rodin, Sculptor.

FREE once more from the repulsive relationship of ignorant and troublesome employers, in firm possession of that insight which directed him to the simplest and purest expression of sculpture, and a facility of hand that made the clay an unobstructive obstacle, Rodin started upon the execution of the statue that was eventually to place him among the greatest sculptors of his country.

But the sailor at Antwerp lay uneasy on his mind. The studies of the past eighteen years were demanding some definite order and classification, some tangible point of departure. The visions of the compositions of the Renaissance Colossus, had a nearer and more forcible effect, and Rodin set out for Italy to study them in their original surroundings.

Of this journey, he says: "In looking at the Medici tombs I was more profoundly impressed than with anything I have ever seen. I mean as a matter of impression, simply. For Michael Angelo, great as he is, is weak in modelling in comparison with the antique. I like his works because they are living and I could find in them what I wanted. After looking at these figures long and well, I returned to my room at the hotel and began making sketches, to test the depth of my own capacity of composition and of the impressions I had received; and I found that I could do nothing like my sailor, unless I copied Michael Angelo. I made no end of sketches, always with the same result. During my journey to Rome, Naples, Sienna and Venice, I continued drawing, in the hope of discovering the principles upon which the compositions of Michael Angelo's figures were founded. I was, at the same time, struck with the idea that these principles were not original with him, but the result of discoveries made by those who had preceded him. I also had my doubts about his being conscious of these principles, or that he was the consummate artist and man that many think he is. He seems to me to have worked little from nature; that he had one figure, or type, that he reproduced everywhere and constantly, and that he took entire figures from Donatello, besides using a certain movement of the wrist and foot, common to the latter. I think Michael Angelo simply completed, in movement and general scheme, the figures whose natural principles of composition were discovered by those who went before him." Rodin returned to Brussels and continued his investigations of the principles of composition upon which Michael Angelo's figures are founded. At last, he solved the problem, and the mystery became clear. With its solution also came the key of the principles inherent in his own nature, and by which he has been guided in all of his subsequent works. He does not feel certain that he would have found them had he not first studied Michael Angelo and discovered the principles by which he was guided. Of them all, he says: "They are found in nature, or she verifies them, if you look carefully enough. They are so simple, that they can be taught in six months to any student of average intelligence, so that he can exemplify them, as facts, almost as well as I can myself. In a word, Nature tells the whole story." The work on "The Age of Brass," also went on, and for eighteen months the sculptor gave it his best efforts, never for a moment feeling that he should arrive at any satisfactory result. "I was in the deepest despair with that figure," he observes, "and I worked so intensely on it, trying to get what I wanted, that there are at least four figures in it." When it was completed he exhibited it in January, 1877, in the Circle Artistique, in Brussels, where it was generally received with derision, pronounced a reproduction from moulds made on the living model, and criticised because it did not stand well.

But a writer on one of the city papers, *L'Echo du Parlement*, recognized its surprising qualities, and spoke of them with deserved words of praise. "The statue," he says, "has made a sensation *among* artists, and will, no doubt, attract much attention in the Paris *Salon*. Wholly taken up as the artist has been — and as every true artist is who makes his art his chief aim — with the question of style and execution, he has only forgotten one thing, and that is to explain his subject. This lack has awakened much criticism, and caused many questions to be asked. Why are the eyes half closed, and that hand lifted up? Is it the statue of a somnambulist? But let us be reassured; all is clearly and logically explained by this title, 'The Vanquisher,' and it suffices to add that the raised hand ought to hold two spears. From a pure art point-of-view, the work is very beautiful, and, above all, very original. It is realism — that which proceeds directly from the Greeks; it is their modelling, in large planes, their accentuation, sober and firm, their learned anatomy but profoundly living, indicated as it is in nature, with movements that change and are sometimes hidden; anatomy studied in the exercises of the gymnasium, and not, like that of the Florentines of the sixteenth century, from a skinned anatomical figure. This realism is not only a striking truth, it is, at the same time, a great selection and a grand style. If M. Rodin ever had a master, he was certainly not one of the realists of these days, who confine themselves so often to servile copying of plaster casts. The statue is inspired by the powerful metopes of the Parthenon, or the supple and robust Ulysses, by Alcamene."

Among the large studies made by the sculptor in Brussels, in the development of his principles of composition, was a group called "Ugolin," but he was not satisfied with it, and destroyed all save the body of the principal figure. This is one of the best examples of his large style of modelling. He also found time, before he began "The Age of Brass," to make a number of heads and figures in terra-cotta, which he could not sell in Brussels, but which were bought by a Mr. Gammon, an English art-buyer, who afterwards sold them at Albert Hall in London. Rodin did not set any artistic value upon these things, but Dalou, an eminent French sculptor, who saw them in London, affirms that they possessed great merit.

Rodin had one, not very satisfactory, transaction with the Anonyme des Bronzes Company. He sold them a very beautiful marble bust which he called "La Petite Manon," for the small price of one hundred dollars. The company, appreciating the commercial value of the work, bought of the sculptor for twenty dollars more the right to reproduce it in bronze. Thinking they had a mine in Rodin which they could work for their exclusive profit, they wished to buy more of his things, but his suspicions were aroused at their readiness to purchase at a low price, and feeling that they had taken advantage of him in the first transaction, he would not let them have anything else.

To a considerable extent Rodin's professional life in Belgium had been satisfactory. For the first time he had been his own master, and engaged upon work that suited his temperament, large compositions of many figures. From first to last he had had his own way. With his genius it was a sublime obstinacy — the obstinacy of all great men. In six years his eyes had become open to the art around him, and he saw it from a different point-of-view. "Up to 1871," he remarks, "I lived in the old idea that sculpture was making progress in France. But it was not true. I had changed during my life in Belgium, and when I came back to Paris my idols had fallen in the dust. I saw that we had no successors to Puget, and that we were really going down hill. The statues that I adored before I went away, I could not bear after I had returned. I do not like sculpture made from plaster casts, it has no life." It is difficult to measure, with any degree of exactness, the amount or character of Rodin's progress while in Belgium. The work he did for public buildings, except in the matter of composition, would hardly be a fair test, and we must rely upon "The Age of Brass" as the consummated result, or, rather the best outcome of what he did in Belgium, at least so far as modelling goes. The result of his study of the principles of figure composition showed itself later on.

"The Broken Nose," made, it will be remembered, when he was about twenty-two years of age, remains the tremendous witness of the power of his earlier efforts, and his own judgment in regard to the merits of the many figures he had executed in the following ten years, some of which he feels sure were as good as "The Age of Brass," must stand good. This being true, his progress was on the side of deeper insight into the subtile secrets of composition, the more exact formulation of his own temperament, greater familiarity with, and better judgment of, fine works of art, and a more correct observation of nature. His own world of art had begun to take in the world around him.

Rodin's individual life in Belgium had been so much more agreeable than it was in Paris, that both himself and Mme. Rodin look back upon it as "the most beautiful and happy days of our lives." In Brussels, they lived in Rue Bourgeoist, quite on the outskirts of the city, practically in the country. They occupied one room, hired of a florist, whose gardens surrounded them, for which they paid twenty-two dollars a year rent. With it they had a garden, twice the size of their room, which contained one tree — a forest to them — and under which in summer they ate their meals, drank French wine, reposed themselves and rejoiced in sylvan happiness. For company, they had a dog, a goat, a cat and some rabbits. Mme. Rodin cultivated her plants and flowers, while her husband lay on the grass and gazed at the merciless firmament above him. Both loved tranquility and the country, and out of it they drank unceasing delight. As Brussels was surrounded by endless fields and fine roads, and both were fond of walking, they made long journeys of many miles, without regard to where they were going, or when or how they would return. In Antwerp their life was the same. There was neither nook, corner, or object of interest that they did not see or explore. Rodin saw all the art there was to be seen. With Rubens he was in love, and copied, from memory, in his room many of the great painter's pictures. Of the art, he says, that "It is all in the paintings, with the exception of Flammingo's infants. In

[1] All rights reserved. Continued from page 45, No. 653.

sculpture, there is nothing else great, though some of it is excellent in execution."

It was in Brussels, in 1872, that Rodin exhibited "The Broken Nose," in the Artistic Circle, and received, for the first time, words of commendation for it. They came from Biot, the engraver, and Baure, a sculptor. The mask was generally admired and helped to make him friends. Among them was M. Jules Petit, a French singer, whose bust Rodin made in terra-cotta. An especially interesting friend was Dr. Thiriar, now a very prominent member of his profession, whom Rodin came to know in this way: He was taken suddenly ill, from overwork, and Mme. Rodin ran for the nearest physician, who proved to be lame. He came, examined his patient, performed an operation and made a number of successive visits. "When I asked him for his bill," relates Rodin, "the doctor seeing, no doubt, that we were not rich, said, very timidly, that he thought that a dollar and twenty-five cents would not be too much. I was so charmed with his conduct that I went soon after to see him, and told him that I should be happy to make his bust as an acknowledgment of my appreciation of his kindness. He hesitated at first, but soon afterwards, consented, and I made it in terra-cotta. I learned, later on, that he consulted some of his friends and made some inquiries in regard to my capacity. Another bust that I enjoyed making, and one of the best I ever executed was of an apothecary, named Vanberkaeler. I made it in marble, though I was not paid for it. He had a remarkable head, of pure Flemish type, with a slight touch of Greek in it." These busts were exhibited, and very highly and justly spoken of by the Brussels papers. The apothecary's bust especially, was praised for its powerful character, and largeness and nobility of style. "A veritable bit of the antique, did not its coat reveal its time and place." The bust of "La Petite Alsacienne," which Rodin had made in Strasbourg, was also shown in Brussels and greatly admired.

Although he had fairly good friends in that city, they could do but little or nothing for him. To all intents and purposes he was quite as isolated as he had been in Paris. Society did not attract him. His home and his studio were his heavens. His general want of close friends, or even interested acquaintances, was often the cause of serious trouble, as the following incident will illustrate: When he went to Brussels he left in his studio, in the Rue Hermel, a large number of precious sketches, a quantity of valuable plaster casts and a clay figure, larger than life, upon which he had worked for two years, had cared for through the war with great difficulty, and upon which he set a high value. All at once, the owner of the studio, one Robinet, took the fancy that he wanted it, and without even informing Rodin of his wish, sold its contents at auction. Nor had Rodin a friend in Paris who cared enough for his interests to either inform him of this shameful transaction, or try to protect his property. When Rodin returned to Paris, instead of finding his studio safe and sound, ready for his occupancy, he discovered that his possessions were scattered to the four winds, and his clay figure, broken to pieces for the purpose of getting the iron that supported it, to sell to a junk dealer. It was truly, as he mournfully says, one of the cruelest events of his life.

As a whole, Rodin's experience in Brussels was like that of all artists everywhere who are entirely given up to their work. The world cares little for them or their art; it only cares for those who care for it. Art, pure and simple, has never won for its creator any particular personal attention, nor is there any reason why it should. Occasionally the artist and man of the world are joined together in one person, as in the case of Rubens. Rodin's groups, bas-reliefs and busts, were forgotten as soon as made, and as things go, there was no reason why their author should be longer remembered.

T. H. Bartlett.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF CHARLES PRUYN, ESQ., ALBANY, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

[Gelatine print, issued only with the Imperial Edition.]

COMPETITIVE DESIGN FOR THE WORLD BUILDING, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR M. S. SEVERANCE, ESQ., LOS ANGELES, CAL. MESSRS. CURLETT, EISEN & CUTHBERTSON, ARCHITECTS, LOS ANGELES, CAL.

THE PLACE OF ARMS, SANTIAGO, CHILI.

THE LOTUS IN ANCIENT ART.—I.

THE IONIC CAPITAL AND THE LOTUS.

Fig. 1.

THE object of this paper is to call attention to certain previously unknown or insufficiently developed facts, relating to the influence of the lotus on Greek ornament which it is hoped may prove of interest, not only from a professional, but also from a popular standpoint.

As introductory topic I have chosen the subject of the Ionic capital, a hitherto unrecognized conventional lotus form. This topic will be found to lead over to that of the anthemion, in other words to the one all-important typical form of Greek ornament,—in its various modifications the most universally recurrent feature of modern decoration. The anthemion is a hitherto unrecognized conventional development of lotus decoration, and in its early history that of the later Greek spirals and scrolls is also involved. In the demonstration to be offered on this head, the "rosette" is included as another hitherto unrecognized lotus motive. The most apparently improbable, yet, most easily demonstrated case of lotus decoration in Greek art is that of the "egg-and-dart" moulding. Its association with the Ionic capital and other Ionic details, is an interesting point connected with the lotiform origin of the latter.

The suggestion that the "egg-and-dart" moulding is derived from an Egyptian lotus border has been previously made by Owen Jones but his interpretation of the evolution is unsatisfactory. I was not, however, aware of his suggestion when my own conclusions were formed. The suggestion that the Ionic capital is a lotus form has also been previously published but without attracting conviction or attention. In this case also the interpretations hitherto given of the evolution are insufficient and in this case, also, my own observations were made without knowledge of the anticipations as regards publication. As publication is universally admitted to be the test of precedence, I only mention the fact that the entire series of observations was made independently, because they have all been based on the study of lotus forms found on Cypriote vases, and because the clue offered by these vases is in my own conviction the only correct one—the only starting-point that will compel from experts in history, in archæology and in decorative art a recognition of the facts asserted. This has not been hitherto accorded the suggestions of a lotiform origin for the Ionic capital and the "egg-and-dart" moulding by any standard authority, nor has the slightest notice been hitherto taken of the isolated suggestions which were correct intuitions of most important facts.

As regards the anthemion, the rosette, and the Assyrian palmette (to be mentioned presently) I believe that both my observations and demonstration are unanticipated, as the demonstration is in all cases. From the observations bearing on the Ionic capital and the anthemion, the Corinthian capital will prove to be a later and remote phase of the same initial motives.

The now generally accepted theory of the Ionic capital and the universally accepted theory of the rosette and anthemion, is that the Greeks obtained them from Assyrian ornament, by Phœnician transmission and by way of Asia Minor. This theory will prove to be no longer tenable and the Assyrian "palmette" itself, hitherto considered the first form of the anthemion, will be proved an Egyptian lotus motive, not a conventional palm-tree as hitherto supposed.

That the Greek spirals and Greek frets are of Egyptian derivation is already obvious from recent publications.[1] Mr. Joseph Thacher Clarke has offered convincing proof on the long-debated subject of the Egyptian origin of the Doric shaft in a recent number of the *American Journal of Archæology* (Vol. II, No. 3). Similar proofs have also been lately published on the head of the Doric Triglyphs.[2] The discoveries at Naucratis, the most important and ultimately the only Greek Colony of the Nile Delta, of which the Boston Museum of Fine Arts offers such interesting specimens, have also given an impetus in various ways to the disposition to connect the origins of Greek art with influences from Egypt.

Thus the demonstration to be offered for the lotiform origin of the Ionic capital, of the anthemion, of the rosette and of the egg-and-dart moulding, will, if it proves satisfactory, only substantiate and widen a point of view for the history of Greek art in general, which has already been acknowledged probable or clear in important particulars. In 1878 when the Cypriote pottery of the Cesnola collections was first exhibited in New York, I called the attention of friends whose testimony is still available to certain cases of lotus decoration, such as appear on the vase in the Metropolitan Museum of Art, herewith

[1] Prisse d' Avennes's "*Histoire de l'Art Egyptien*," Schliemann's "*Mycenæ*," "*Orchomenos*," and "*Tiryns*."

[2] Auer in "*Zeitschrift für*" *Bildende Kunst*" 1880 (colored Illustrations at the close of Durm's "*Baukunst der Griechen*.")

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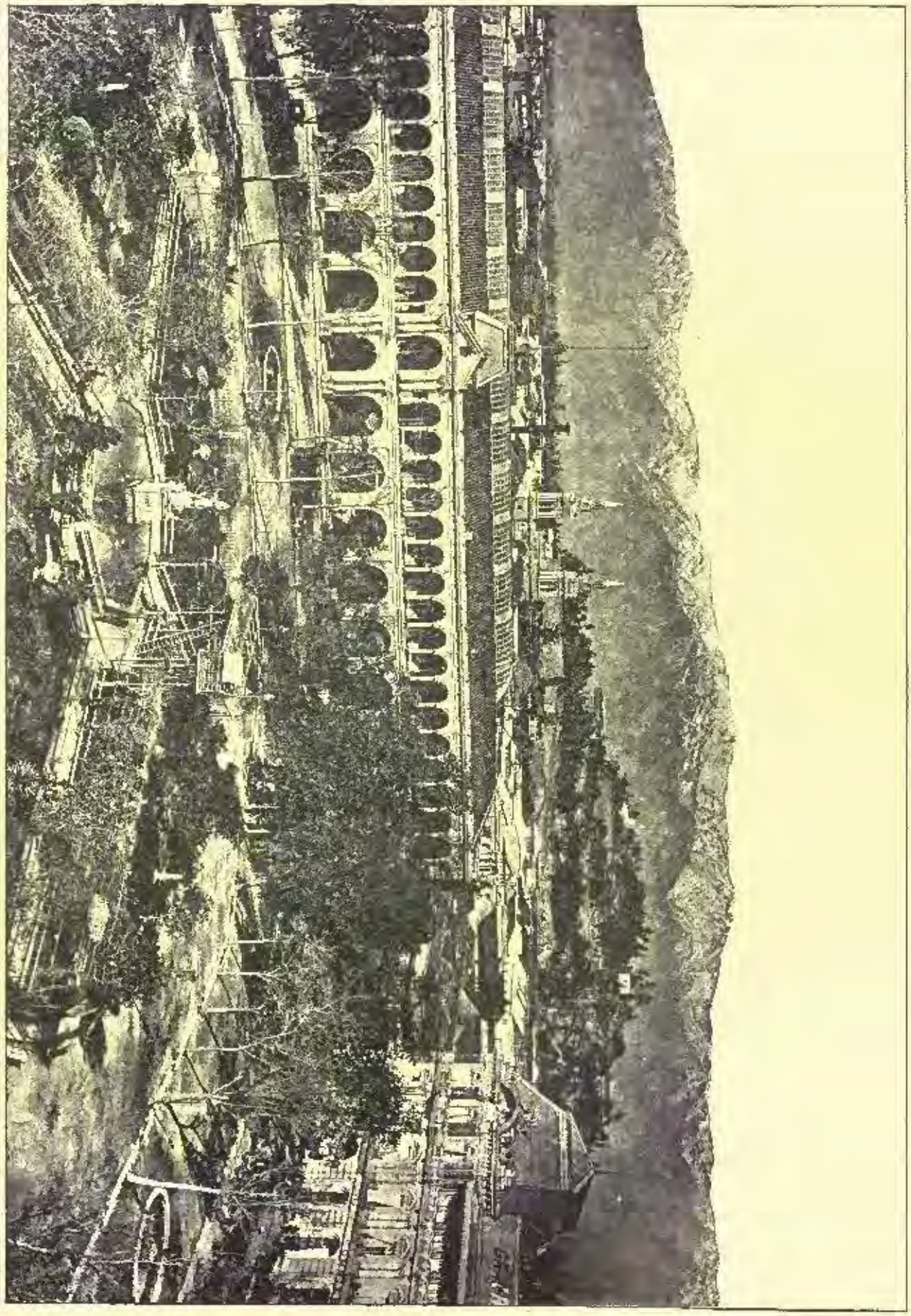
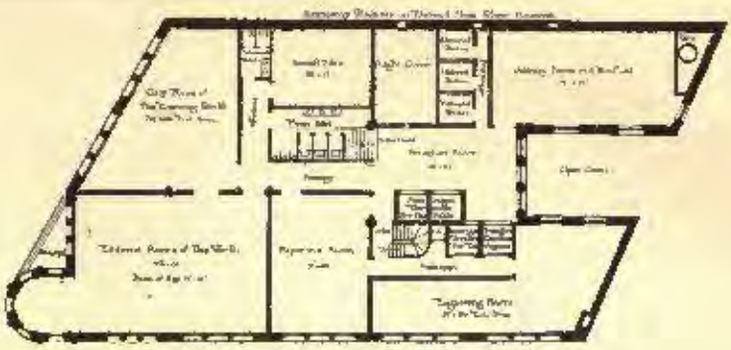


—THE PLACE OF ARMS, SANTIAGO, CHILI.—

Heliotype Printing Co. Boston.



Eleventh Floor Plan.

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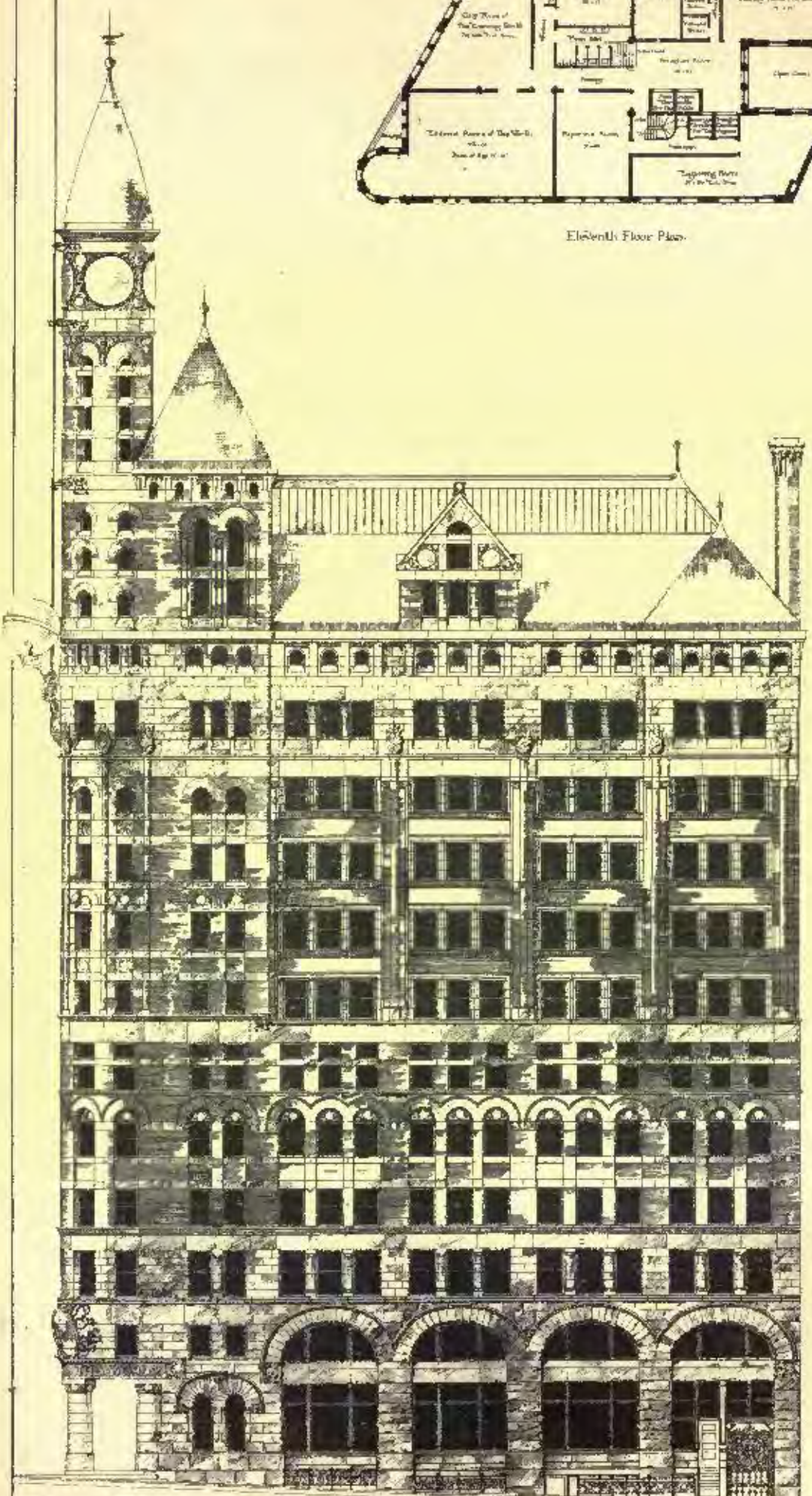
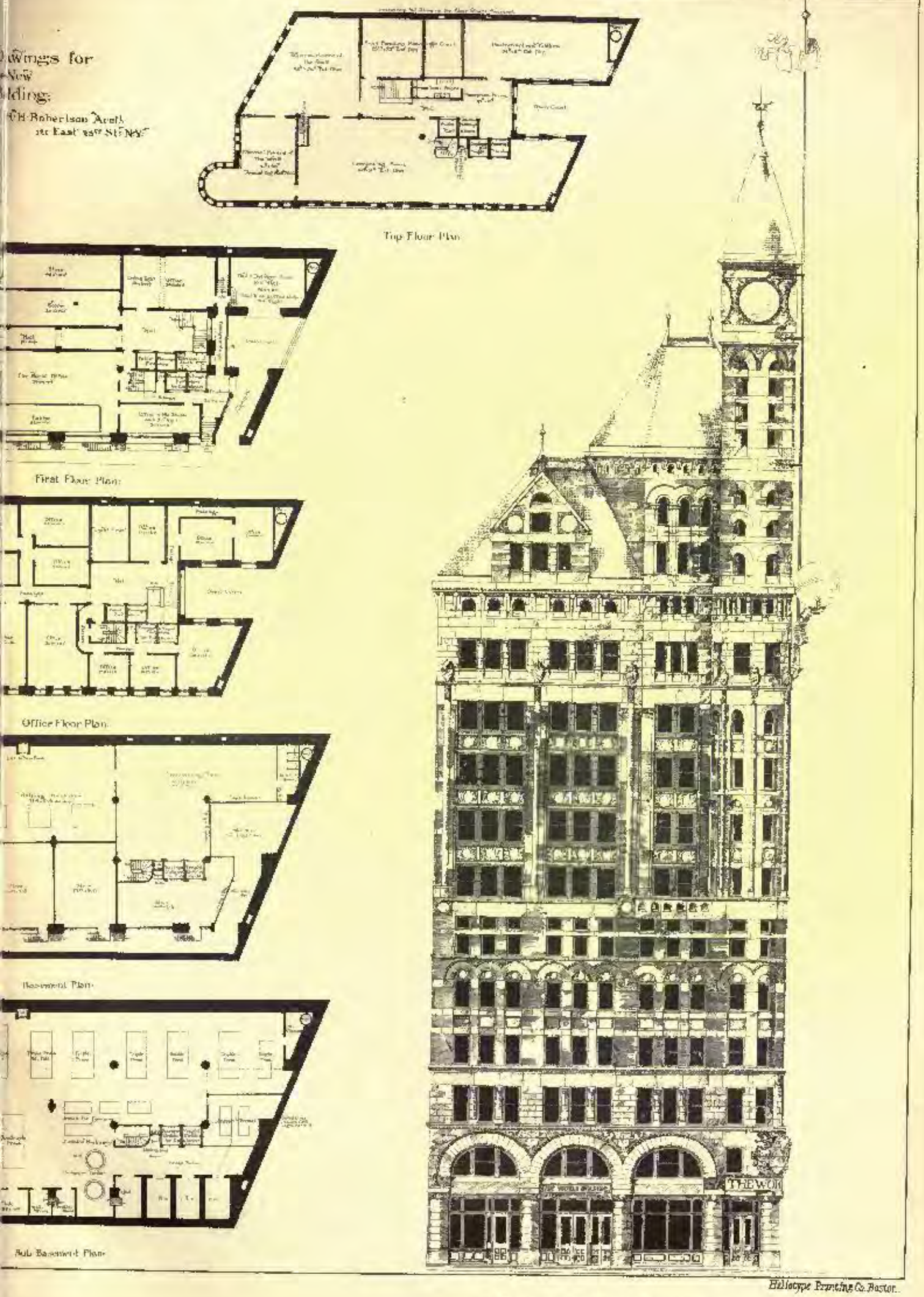


Elevation on Frankfort Street.

Scale - 1/8 in. = 1 Foot.

Drawings for New Building.

C. H. Robertson Arch.
1st East 18th St. N.Y.



Top Floor Plan

First Floor Plan

Office Floor Plan

Basement Plan

Sub Basement Plan

Heliotype Printing Co. Boston.

Elevation on Chatham Street.

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HOUSE OF CHARLES BRUYN, ESQ., ALBANY, N. Y.

R. W. GIBSON, Architect.

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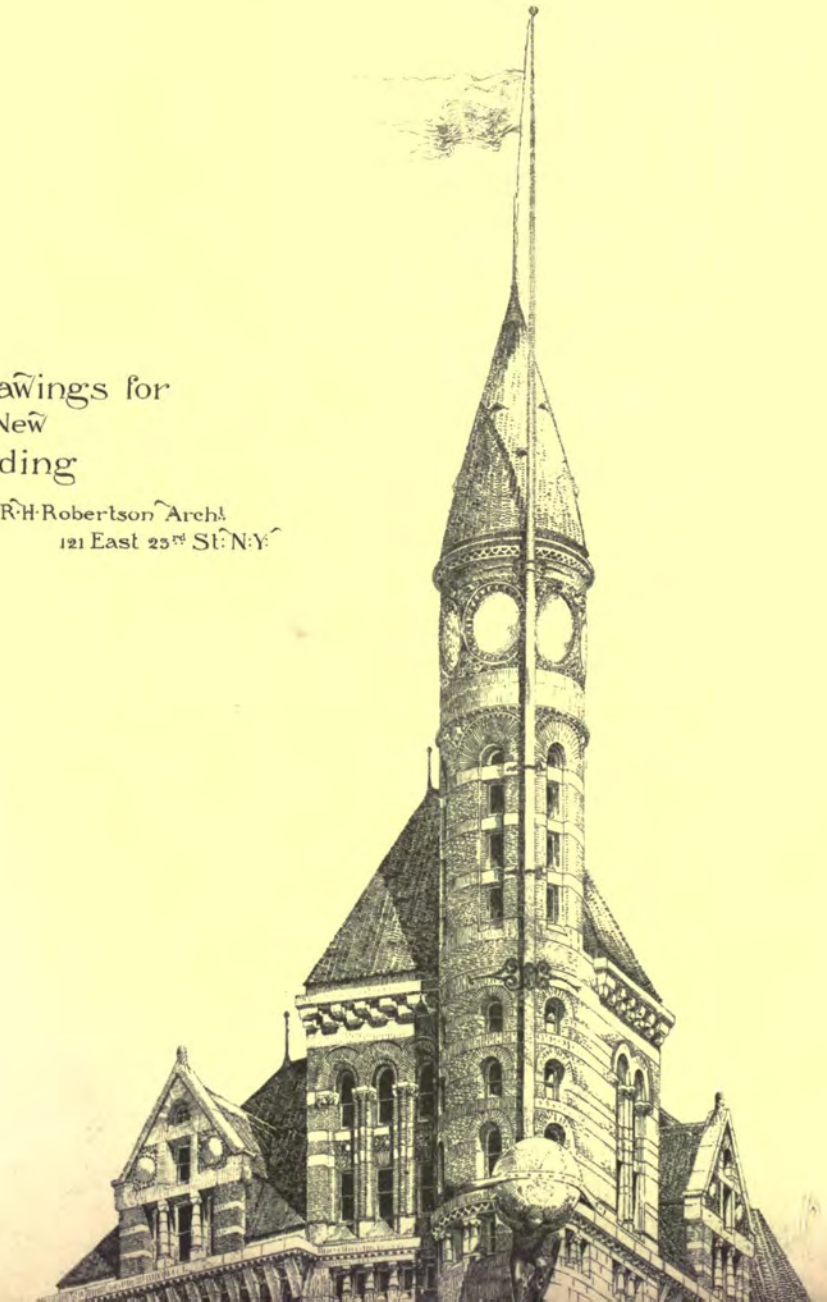
Competitive Drawings for
Proposed New
World Building

R. H. Robertson Arch.t
121 East 23rd St. N. Y.



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Heliotype Printing Co. Boston.

figured, with enlarged details from similar vases (Figures 1, 2, 3,) which seemed to me to argue a lotiform derivation for the Ionic capital.

The lotiform derivation of the Ionic capital was first suggested, but on other, and I think it will appear on less satisfactory grounds, by French students in 1875 and 1885. In 1875 Georges Colonna-Ceccaldi (since deceased) published an article in the *Revue Archéologique* on a Cypriote sarcophagus now in the New York Museum and known as the sarcophagus of Athienee, in which he also published one of two tombstones found with it and also now in the New York

Fig. 2.

Fig. 3.

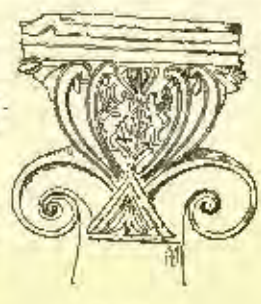


Fig. 4.

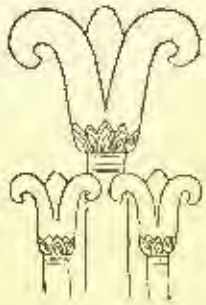


Fig. 5.

Museum. One of these is figured at 4. He asserted this stèle to be a conventional representation of the lotus in which the triangle between the volutes figured the ovary of the flower. The volutes themselves were interpreted as petals curled over and the introrse scrolls above were supposed to represent the stamens. It will be subsequently shown that the details of this interpretation are all erroneous but it will also appear that the intuition regarding the entire form was correct. As the lotus is an Egyptian symbol of the Resurrection, the suggestion in this sense was extremely apt although this point was not made by Colonna-Ceccaldi.

In 1885, Mr. Dieulafoy, the distinguished explorer of the ruins of Susa, announced the lotiform origin of the Ionic capital in his "*Monuments Antiques de la Perse.*" His starting-point was a form of Egyptian capital found in relief representation at Karnak (eighteenth dynasty)[1] figured at 5. He interprets the scrolls as representing lotus petals conceived as curling downward under pressure and the object between them as a representation of the ovary. It will appear later that this interpretation which corresponds essentially to the earlier one by Colonna-Ceccaldi, is also incorrect in detail but correct as to result.

In 1886, a summary of the literature of the Ionic capital up to date, was published in the *American Journal of Archæology* (Vol. II, No. 1), by Mr. Joseph Thacher Clarke which did not include the suggestion of its lotiform derivation. This led me to examine the New York Cypriote vases more closely and to connect the lotus motives on them with others, to be subsequently illustrated, in such a way that I believe the fact may now be asserted definitely and conclusively that the Ionic capital is derived from a conventional form of lotus flower and that it is of Egyptian origin. My view has been adopted by Prof. Allan Marquand, of Princeton, in a recent number of the *American Journal of Archæology*, (Vol. IV, No. 1). It has been considered with much interest and I believe with approval by Prof. A. L. Frothingham, Jr., of Princeton, the editor of the *Journal* and has otherwise met the approbation of experts. The observations on the Ionic capital led me to those on the anthemion or palmette, a more important, because a more universally employed decoration and there seems to me, to be no escape from admitting that they are a necessary consequence of the demonstration for the Ionic form.

The interest of the related observations is considerably enhanced by the recent successful efforts to naturalize in this country the various water-lilies, commonly known by the one name of "lotus" and by the opportunities to observe the natural flower which many of us have thus recently enjoyed. Mr. E. D. Sturtevant, of Bordentown, N. J., and Mr. Benjamin Grey, of Malden, Mass., are florists who have been especially prominent in this connection. From the lily-ponds of the former the fountain basins of the various parks in New York have, for instance, been very generally stocked with lotus-plants of all three kinds known to the ancient Egyptians.

The cut numbered 6 shows a selection of details from these plants, combined from sketches made in Union Square, New York.

The plant most generally quoted as a "lotus" is now extinct in Egypt and Africa, but still grows in Asia. It bears the flower so well known in Oriental art and decoration as the emblem of Buddha. According to botanical terminology, this *nelumbium speciosum* is not a lotus. It is distinguished by the peculiar seed-pod seen on the left of the cut, shaped like the spout of a watering-pot and containing seeds about the size of small filberts, by a bulbous, tulip-like shape of bud, by much larger petals than belong to the lotus proper, and by the fact that its leaves grow by the centre in bell-shaped form on erect stems rising above the water. Botanically speaking, the word "lotus" is confined to the large white water-lily, *nymphæa lotus*, and large blue water-lily, *nymphæa cærulea*, but the flowers of all three kinds of plants are closely allied in appearance, aside from distinctions of color. All resemble the common pond-lily, although superior to it in vigor, beauty, and size. Unlike the pond-lily, the flowers of all three plants rise high above the water on erect stems. The leaves of the white and blue lotus float on the water.

The pond-lily occasionally exhibits a phenomenon as regards the calyx leaves, which can be more distinctly observed in the Egyptian water-lilies, because they are larger and stand so high above the water. In the Egyptian varieties of the lotus the calyx leaves forming the outer coarse-green envelope of the bud and partly-opened flower frequently or occasionally curl over and downwards after the flower opens, as seen in the cut, and as represented in the flowers of certain Cypriote vases above referred to (Figs. 1, 2, and 3). This downward curl of the calyx leaves appears to have been the starting-point of a lotus motive with exterior volutes, ultimately developed into spirals, which, for decorative reasons, finally became, as far as the Ionic capital is concerned, the one remnant of the original floral form.

The suggestion of Colonna-Ceccaldi and Dieulafoy that the Ionic volutes represent curling lotus-petals is not supported by any related appearance of the natural flower, as the petals never curl downward

Fig. 6.

or outward. When the lotiform origin of the Ionic capital has been universally conceded, the details of the interpretation would not be a matter of vital importance. As long as these intuitions of the true origin of the Ionic capital have not been quoted or mentioned by a single authority, it is important to present an interpretation which compels acceptance. The first step in this direction is to insist on the point that the lotus-flower occasionally exhibits a phenomenon which was observed by ancient decorators in a manner to which the Ionic volutes fairly correspond.

The different lotus-varieties, as above described, are occasionally distinguished by naturalistic coloring in Egyptian design, the blue lotus especially, but more frequently only the form of the flower is indicated in a variety of color combinations of purely conventional character. It does not appear that the rose-lotus, *nelumbium speciosum*, had a more distinctly sacred character in Egypt than the white and blue water-lilies, although this has been sometimes supposed. Egyptologists simply speak of the "lotus," without distinction as to its varieties in the information given as to its sacred significance.

The opinion of Wilkinson, expressed in his "*Ancient Egyptians*," that the lotus had no sacred significance must be abandoned, in view of the numerous opinions of later authorities. It was a symbol of the Resurrection, according to Pierret ("*Panthéon Egyptien*," p. 62). It was the flower sacred to Osiris, the God of the Resurrection, and usually crowned the altars of offerings to him. The four "Genii of Amenti," i. e., of the world of departed spirits, are for this reason sometimes represented in Egyptian pictures of the "Last Judgment" and otherwise as standing on the lotus. Bouquets of lotus-flowers were presented to the guests at Egyptian funerals, undoubtedly for this same reason.[2] According to Maspéro, the lotus was one of the mystic forms or habitations of the departed spirit. According to Prisse d'Avennes, the lotus was an emblem of life and of immortality.

The association of the lotus with Osiris explains that with Horus, the child of Osiris and Isis. The infant Horus appears frequently in Egyptian temple-reliefs seated on the lotus, or rising from it. In his various guises of hawk, of hawk-headed human being, or human-headed hawk, the lotus constantly appears as his attribute, as it is also that of Isis. The identity of Horus with the sun and with the solar-winged disk (Pierret) so constantly represented on the Egyptian monuments thus explains, also, an association of the lotus with solar worship, and involves the fact that the lotus was a symbol of the sun, which can, moreover, be abundantly demonstrated from monuments to be subsequently quoted. Finally, the flower is known to have been a generative emblem. For this significance, the association with Osiris in his generative and reproductive character is sufficient demonstration. The association of the lotus with Phallic representations of the Egyptian divinities is very common. As the Apis

[1] "A Proto-Ionic capital from the site of Nebuchadnezzar."

[2] Osburn's, "*Monumental History of Egypt*," Vol. 1, p. 43.

Bull was considered an incarnation of Osiris, the association of the lotus with Apis is also a frequent appearance on the monuments. The third member of the Egyptian Trinity was Isis, the spouse of Osiris, mother of Horus, and Moon-Goddess. To her, also, the lotus was consequently sacred.

In the decorative motives of the Egyptian tomb pictures, borders, panels, friezes, etc., the lotus is the most constant and almost exclusively dominant form. In the temple architecture it forms the basis for all capitals antedating the Ptolemaic period (see Reber's "*History of Ancient Art*"). The Egyptian words for lotus and for the capital of a column are interchangable as appears from translations of Maspéro in his "*Historie des Peuples Anciens de l'Orient.*" Although the papyrus has been frequently considered as having suggested the motive for the campaniform capital the contrary can be conclusively demonstrated. Other confusions of lotus-forms with that of a supposed papyrus can be also shown to have been made and increase the admittedly overwhelming preponderence of the lotus and its derivatives in Egyptian decoration to a maximum which is almost exclusive of other forms as regards surface ornament.

The preponderance of lotus motives in Egyptian art and decoration, being sufficiently explained by the dominance of the Osiris and Horus cult and by the well-known hieratic and symbolic character of all Egyptian art, we have no difficulty in recognizing the source and *raison d'être* of the lotus motives so constantly found in the decorative art of the Phœnicians and on the vases of Cyprus.

The solar cult was a dominant one among the Phœnicians and their adoption of Horus worship, of the winged solar disk and of various forms of lotus decoration from the Egyptians, is one of the most palpable illustrations of their well-known dependence on Egyptian influences. Rénan speaks of Phœnicia as a "province of Egypt" in matters of religion (*Mission de Phénicie*). The myth of the death and resurrection of Osiris is distinctly connected with localities on the Syrian coast, and the worship of Osiris is known to have been especially affected at Byblus, of which seaport the earliest Phœnician colonists of Cyprus were native. It is also recorded to have been the distinctive cult of Amathus, one of the oldest Phœnician settlements in Cyprus. Such special points are not as important as the general one, that Phœnician decoration exhibits a preponderance of lotus forms and derivatives, similar to that found in Egyptian art and explained by it. The close and early relations between Phœnicia and Egypt are made especially vivid by the fact that the cedar oil on which the Egyptians were absolutely dependent for their most generally practised method of embalmment (the second in the scale of costliness and pomp) was entirely supplied by Phœnician commerce and manufacture.

The dependence of early Cypriote art on the Phœnicians of Syria, and the general dependence of the Phœnicians on Egypt for many mythological conceptions, and for the symbolisms, forms and motives of their own hieratic art, thus justifies a treatment of Cypriote decorative art from a standpoint which regards it as a unit in the matter of its lotus motives, and which justifies the search for analogies between decorative motives of Cypriote capitals and stèles and those found on its pottery. The stèles in question were tombstones. The pottery has been, without exception, found in tombs, and as the lotus was the Egyptian symbol of the Resurrection, and also of a solar Horus worship especially affected by the Phœnicians, the association is palpably significant. The worship of the moon and of a moon-goddess, either Isis herself or one assimilated to her, or both, is well-known to have been a prominent Phœnician cult. Hence the associations of the lotus with Isis worship above explained are also in point.

Fig. 7.

As for Phœnician capitals, which are known by a number of reliefs to have especially favored the Ionic form, we may, without insisting in all cases on a symbolical significance, which can be shown to have existed in some cases, simply point to the general fact that Phœnician architectural decoration was especially derived from Egyptian sources, and that lotus Ionic forms can be demonstrated to have existed in Egypt near the eighteenth century B. C. (beginning of the eighteenth dynasty). One indication of this fact is offered by the painted imitations of architectural capitals in wood or metal, of which an illustration is offered at Fig. 7, from a tomb at Thebes of the time of Menephtah, son of Ramses II. The Ionic form appears distinctly in the upper member of this capital.

As regards the pottery of Cyprus, it is not necessary to assume that the decorators of the vases had invariably preserved a consciousness of the symbolical significance of the lotus decorations so universally found on them. The Greek colonists of Cyprus borrowed the Phœnician art before the dawn of recorded Greek history, and before there was an independent art in Greece; but, with a conservatism otherwise attested for the Cypriote Greeks, and otherwise unknown to Greek art, they perpetuated these Phœnician forms down to the time of Alexander the Great and later. In the demonstration to be subsequently offered we are thus freed at the same time from difficulties regarding the question of dates, and from the suspicion calculated to fall on those who look for symbolical meanings in Greek decoration. The lotus motives were traditional, and had been conventionalized to an extreme degree in their symbolical stage, and the art of Cyprus was so conservative that the most expert students are unable to distinguish between the pottery of Cypriote Greeks and that of Cypriote Phœnicians, or to specify distinctions in style dependent on succession of time in either case. Vases demonstrably of the second century B. C., resembling Fig. 7, belong to types, and show lotus motives which are demonstrably as early as the fifteenth century B. C.

The same conservative character in Cypriote art also saves us from the uncertainty regarding dates in the matter of the Cypriote proto-Ionic stèles and capitals to be illustrated and considered. These may be individually of relatively late date (Figure 4 is certainly not earlier than 500 B. C.), but there is no doubt that they represent types of sufficient antiquity to serve as links in a chain of demonstration affecting the Greek Ionic forms. A glance at the geographical position of Cyprus, the only spot on which Greeks and Orientals met and amalgamated from the earliest to the latest dates of Greek history without interruption and without national feuds or animosity (before the time of the Persians), gives sufficient explanation how and why connecting links of all kinds for the relations of Greek and Oriental art, as well in sculpture as in architecture, should be found on this particular island. The peculiar conservatism of the Cypriote Greeks is undoubtedly explained by the same Oriental influence and character.

The foregoing preliminary remarks are essential to a satisfactory argument based on the illustrations to be subsequently presented. Above all, the point must be kept in view that Cypriote Greek art in general exhibits the first stage of the development of Greek art in general, of whatever date the individual piece of record. A few words are now necessary as to the present accepted theory of the origin of the Ionic capital.

Standard authorities are united, so far, in deriving the Ionic capital from Assyrian architecture. So far as actual remains are concerned, only one Assyrian capital has been published, and only two or three capitals are known to be in existence. The evidence is found in Assyrian bas-reliefs, notably in an aediculæ represented on a relief from Khorsabad, figured at 8, and in the capitals of an aediculæ represented on a tablet found at Sippara, in Babylonia, and hence known as the Sippara tablet. This form of capital is figured at 9. The latter is dated between the eleventh and ninth centuries B. C. The Ionic of Khorsabad is of the eighth century B. C. As there are no definitely dated Greek Ionic capitals earlier than the fifth century B. C., and no records of Greek Ionic temples earlier than the sixth century B. C., the precedence of the Assyrian forms is clear, and the presumption in favor of the Assyrian origin of the Greek Ionic is apparent.

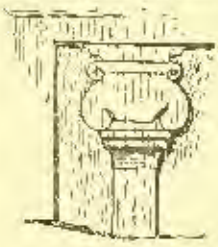


Fig. 8.

Fig. 9.

From the standpoint of this presumption, Mr. Clarke published in the essay previously mentioned a capital which he recently found at Chigri (ancient Neandreia), in Asia Minor, during his explorations at Assos (Figure 10). This capital was supposed by him to be a corroboration of the theory advanced by the German architect and esthetic critic, Gottfried Semper, in his work on "*Style.*"[1]

Semper considers the volutes at the base of the Assyrian palmette,

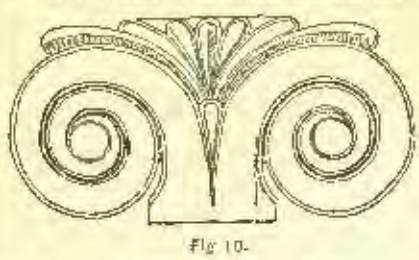


Fig. 10.

Fig. 11.

of which one form is shown at Figure 11, to be the original starting-point of the Assyrian proto-Ionic. The palmette form itself has been universally considered a derivative from the palm-tree, as represented on Assyrian reliefs (Figure 12), and Mr. Clarke supposes the pendant bunches of dates, which are always conventionally represented as shown in the cut, to be the starting-point of the decorative scrolls at the base of the palmette.

Semper's theory conceives that the upper palmate portion of the palmette was gradually eliminated in architectural usage, as unfitted for position under pressure, and that the scrolls were consequently and correspondingly developed. Mr. Clark naturally considered the Neandreian capital to be a vestige of the palmette origin of the Ionic, and published in support of this view three details of ivory plaques from Nineveh, in the British Museum, one of which is figured at 13. These details appeared clearly enough to be connecting forms between 10 and 11, and might fairly be considered representative of similar lost architectural capitals. As the Greek

[1] "*Der Stil in den technischen und tektonischen Künsten.*"

anthemion (typical form from an Attic vase at Figure 14) has so far been always related to the Assyrian palmette and to the palm-tree, through that ornament, the attractions of a theory which unites the anthemion and the Ionic capital as developments from the same starting-point are apparent, and the connections between 10, 13 and 14 are too obvious to be disregarded. Moreover, two other

Fig. 12

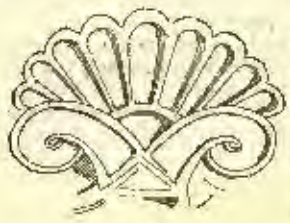


Fig. 13.

Ionic capitals, more or less similar to that from Neandreia, have been still more recently discovered at Athens, and have just been published by Mr. Trowbridge, in the "*American Journal of Archæology*" (Vol. IV. No. 1).

It thus appears that the theory of the lotiform origin of the Ionic capital which necessarily carries with it the theory of an Egyptian derivation, is antagonistic to the accepted theory of an Assyrian origin, and also to recent corroborations of this theory of an apparently conclusive character. It is clear that no theory of Ionic origins can now be accepted which does not reckon with the capital from Neandreia. But the antagonism is only partial, and is more apparent than real. It would be absurd to question the importance of the Assyrian proto-Ionic as, at least, the possibility that it was a reactive element through Asia Minor on the development of Greek forms. It is only necessary to show that the Assyrian proto-Ionic forms are themselves derived through Phœnician meditation from Egypt, and that the Egyptian Ionic passed more directly to the Greeks by way of Syria and Cyprus. This can be done by analogies between the Egyptian Ionic and the lotiform Ionic motives of Cyprus. The ivories which are so interesting as connecting links can be shown to belong to a series of admitted Egypto-Phœnician manufacture.

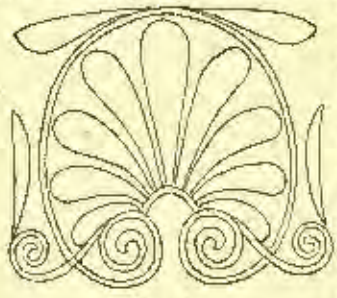


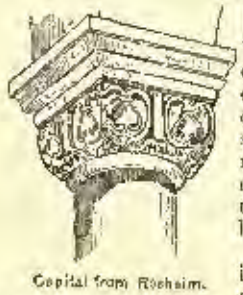
Fig. 14.

The crucial question is that of the Assyrian palmette. Strange as the assertion may seem, this form is not originally Assyrian, and it is not a palmette, *i. e.*, not a palm-tree. As remarked at the opening of this paper, the "rosette" which has so far been always considered an Assyrian and Babylonian decoration, is an element of the problem. This is also Egyptian, and it is also a lotus motive.

These points are naturally too important for despatch in a single paper, and it will, therefore, be understood that the analogies and comparisons for the Ionic capital, which appear in a following article, are also introductory, and that they are not propounded as absolutely conclusive alone and in themselves before the consideration of the anthemion is reached. That they will, at least, throw the scales of the balance into equilibrium, as regards the rival claims of Egypt and Assyria I have not the slightest doubt. As the question is one which involves most of the scrolls, spirals and rosettes of modern decoration; beside the Ionic capital itself — the tracing back of these various motives to a single typical flower — an emblem of the belief in a future life so dear to the ancient Egyptians is a matter of general popular interest. I presume that the archæological considerations involved may be considered interesting in their results, if not in themselves. WM. H. GOODYEAR.

(To be continued.)

COST OF EXECUTING SOME CLASSES OF ENGINEERING WORK.[1]



Capital from Rochaim.

DURING the past twelve years, while in charge of various engineering undertakings, the author has devoted a good deal of attention to the cost of executing different classes of work, and it has occurred to him that a short paper on this subject might not be uninteresting. He regrets that he has not taken full advantage of his opportunities in this way, and also that some of his memorandums have been lost in moving about.

The author proposes to take up the following classes of work: — 1. Puddle trenches and puddle. 2. Miscellaneous earthwork. 3. Concrete work. 4. Masonry.

The factors which appear chiefly to demand consideration in endeavouring to arrive at an estimate of the probable cost of excavating any puddle trench are: — 1. The geological strata to be cut through. 2. The quantity of water likely to be met with. 3. The maximum and average depths from which the spoil has to be excavated before the impervious strata are reached. 4. The methods of excavation to be adopted.

The first two of these, which might, perhaps, be more properly taken as one, the second being a consequence of the first, are necessarily the most important considerations in determining both the cost of execution and the ultimate success of any puddle trench. Before the site of an embankment is finally fixed on, its geological formation should be very carefully investigated, not only by means of borings, which, taken by themselves, are generally very illusory, but by trial pits, the number depending on the length of the trench, sunk well into the strata in which it is proposed to found. Great is the difference in the amount of work done per man day, in different materials, at about the same depth. For instance, in trap or whinstone rock at a depth of 40 or 50 feet from the surface, a man can barely excavate ¼ a cubic yard per day, at a cost of about 8*s.* per cubic yard, whereas 2½ cubic yards of sandy clay or blaes can be removed at the same depth, costing only about 2*s.* 3*d.* per cubic yard.

It is obvious, also, how seriously the expense of excavation of an otherwise easy material may be augmented by the presence in it of water in large quantities, quite apart from the mere question of pumping. This is, perhaps, best exemplified by sand, which, when dry, can be taken out more easily than anything else, but when it is changed into running sand by water, and if mingled with boulders, often gives an infinite amount of bother. In the case in point, for a time, only ⅛th cubic yard could be got out per man day.

The next point to be considered is the depth at which the excavation has to be done. For the first 5 feet the soil can be cast out as it is dug, but below that depth either a staging must be introduced, and the stuff cast onto it, and from it again to the surface, or in the wings of the trench it may be wheeled out in barrows. When the depth exceeds 12 feet or 15 feet, mechanical aid must be called in, and the materials excavated raised to the surface by horse or steam-power, by appliances similar to those already described. As might be anticipated, the reduction due to this cause is most rapid down to a depth of about 15 feet. It then becomes gradually less, until, after 30 feet is reached, it is comparatively slight, and is due almost exclusively to the time lost in lifting the spoil and to the diminishing amount of light which reaches the bottom of the trench as the depth increases, especially in winter. Additional depth also means additional pumping-power, which must not be left out of account.

Puddle. — The cost of puddle varies in proportion to the distance from which it has to be conveyed to the embankment and the nature of the clay, boulder clay requiring much more working to make it into good puddle than some of the softer clays, and it also requires to have a great many stones picked out, though this is frequently carried too far, a few stones, if they are not too large or allowed to touch one another, being in some respects rather an advantage than otherwise, as they tend to prevent the clay from cracking and fissuring, in contracting, and also somewhat increase its weight. If water for "souring" the clay is difficult to obtain near the site it adds to the cost. It is generally best to "sour" for clay as close to the bank as possible to reduce the weight of material transported, and also because the water from it assists the subsidence of the banking. On the Paisley Water-works one of Priestman's diggers was used with very good results for lifting the puddle from the heaps and casting it into the trench. Puddle in the trench usually costs somewhat more than that in the wall, all other things being equal, on account of the pumping required and the labor expended in removing timber.

Miscellaneous Earthworks. — Most of the remarks already made with reference to the cost of excavating puddle trenches apply to that of sinking deep foundations, in which neither caissons nor coffer-dams are used. In excavations, when barrow-work is resorted to exclusively for the removal of the soil, the work done per man engaged depends considerably on the length and gradient of the barrow road; if this be level or nearly so, an additional wheeler must be put on for every 30 to 35 yards of distance, or if on a slope of say 1 in 10, the length of the stages would require to be reduced to about 25 yards. In the case of rock excavation, not only is the degree of hardness of the rock to be considered in estimating the cost of its removal, but also the way in which it is "bedded" forms an important item. Especially is this so in taking out narrow channels and foundations, and there is much more scope in this class of work for the exercise of economy in the judicious use of explosives, etc., than in ordinary earthwork.

Concrete work. — In making concrete, the labor expended per cubic yard is greatly dependent upon its mass form, and the amount of face work, if any, per cubic yard. In foundations, under ordinary conditions, about 2½ cubic yards can be mixed and put in per man day by manual labor, whereas in confined positions, such as in coffer-dams, etc., this may fall as low as ¾ cubic yard per man day. It is always of importance to place the mixing-platform as nearly as possible on the same level, as well as as close as possible to the position where the concrete is required, on account of the disgregation of the materials caused by a tip of a considerable height; and to wheel it down a steep incline is hard on the men and leads to the loss of time. In making the screening-well at Aurcknawe Reservoir and Waterworks, which was constructed of concrete faced with bricks, only 1¼

[1] From a paper by Mr. A. Fairlie Druce, read at a meeting of the Civil and Mechanical Engineers' Society.

cubic yards were done per man day in the lower part of the wall where the concrete had to be wheeled down a slope of 1 in 10, whereas 2.55 cubic yards were done per man day in the upper part with a barrow road at 1 in 50. In designing concrete work, both with a view of saving time and to obtain good work, it is advisable to make the corners as few as possible, and with large "splays," and the curves of as large a radius as the exigencies of the work will admit of, as sharp radii involve a good deal of loss of time in framing. Making all due allowance, however, for economy in labor, to be effected by careful design and management, the cost of concrete-work is chiefly dependent, the proportions being the same, on the local conditions governing the price of cements, etc. If cement and sand are dear, and a good rubble is easily obtained, it is often cheaper to use it than concrete, and in many cases quite as efficient, as the cost of breaking stones is saved, and somewhat less sand and cement is needed than is required for concrete at, say, 6 to 1.

Masonry. — The price of masonry, like that of concrete, is of course chiefly controlled by local circumstances, which have all to be investigated and weighed before its cost is estimated or its class fixed on; that is to say, whether it is to be brickwork, ashlar, or rubble, supposing the particular requirements of the projected work admit of such a choice.

Ashlar. — Save in special cases, such as important copes, etc., in most classes of engineering work where it is necessary to use ashlar, "dabbled" or "scabbled" work will be found sufficiently fine, and the time demanded for them is only about half that needed for "droving," and one-third of that for "polishing," so that they might with advantage be more frequently substituted for these.

Rubble. — As a rule, however, where stone is plentiful, nothing better can be used for work below ground, such as retaining-walls, etc., than good solidly built rubble, faced with what are called in the North "stoddies," *i. e.*, stone squared on the face joints. From 1¼ to 1½ cubic yards can usually be done per man day at this description of work in light retaining-walls, etc., of 2 to 3 feet thick without a crane, and with a crane in viaduct piers. In heavier masses of masonry, such as abutments, heavy retaining-walls, etc., about 2½ cubic yards can be done per man day. In one of the abutments of the Clyde Viaduct as much as 5 cubic yards were accomplished per man day, but in this case the stone used was quarried immediately along-side the building, placed by the quarry steam-crane straight onto the work, which enabled very large stones to be used.

In Northern Italy, where good building stone is usually very plentiful and labor cheap, a good mason only receiving 3.5 lire a day, masonwork can be done very cheaply, the best class of hydraulic masonry, built of mortar, composed of one of Casali cement (an Italian copy of Portland cement), one of Casali hydraulic lime, and four of sea-sand, only costing 10*s.* to 12*s.* per cubic yard in the neighborhood of Genoa. If river-sand is used, the price is reduced to 8*s.* a cubic yard; but this latter, being formed by the action of water on limestone rock, contains silica, and consequently a very inferior mortar is the result.

In conclusion, the author may say that no greater mistake can be made than that frequently fallen into by small contractors of trying to dispense with necessary "plant," carrying on works in a hand-to-mouth sort of way, using manual labor where cranes should be employed and horse-power where steam is required. Money judiciously expended in suitable "plant" is sure to repay the contractor in the long run by saving much more than its equivalent in time, labor, and trouble.

BOOKS AND PAPERS.

THE opinions passed upon the works of Rude have been as variable as the English climate. Lauded to the artistic skies by some as a Burgundian Phidias or Michel-Angelo, he has been scoffed at and depreciated by others, as if there were no merit whatever in his sculptures. Perhaps the truth lies, as usual, in a middle course.

Born of humble parents in a back street of Dijon, in 1784, Rude seems to have imbibed democratic notions while working at his father's forge; for in 1792, such was the enthusiasm of the latter, for the cause of the Republic, that he enrolled the boy in a scholastic corps called by the people, the *Royal-Bonbon* regiment. Thus his life was divided between smithing and soldiering, until an accident in the form of a red-hot bar falling upon his foot, turned his attention to drawing; and, when about sixteen years old, he began seriously to take lessons, working early and late. In 1807 he went to Paris and was employed by Deseon upon the Vendôme column. This and the stirring events which were quickly succeeding one another, seem to have made him a violent Bonapartist; and we find him and four or five fellow-students turning the heads of the soldiers who accompanied Marshal Ney to Dijon, to stop the progress of the *ogre de Corse*, on his return from Elba. Rude and his friends stood on the steps of the theatre, and as the troops passed (some 18,000 men) the boys cried, "*Vive l'empereur!*" The first detachment went by, astonished, but unmoved; but, as the cry was repeated over and over again it took effect, and the soldiers joined in with a unanimous "*Vive l'empereur!*" and next day the officers followed suit. After Waterloo, Rude joined David the painter at Brussels, where a great deal of his work was accomplished, and where he married Sophie Frémiet, an accomplished artist and musician. Besides being a painter of merit and pupil of David, Sophie was an enthusiast, for when her husband had no money to continue his "Pêcheur Napolitain," she suggested that they should sell some necessary garments: "*Nous vendrons nos chemises*"! All artists are not blessed with such self-sacrificing partners, unhappily; but, then, Rude's wife knew the trials of making bricks without straw, and the miseries of being stayed from carrying out great ideas for want of a little necessary filthy lucre.

Whatever Rude may have been as an artist, his private life was exemplary. He loved his home and his work, and in the evenings when not drawing or modelling, he read or listened to his wife's music. An indefatigable worker, and in merit the equal of any of the sculptors of his own time; he never was received at the Institut, because he was above scheming for a *fauteuil*; but, nevertheless, he acceded upon one occasion to the persuasion of his friends, and became a candidate. Promised by many that he should have their votes, the election proved that he had had none. But there was no love lost between him and the *Immortels*; for, while he called them the *pâtissiers*, they dubbed him "*l'homme à la barbe*"; and when he heard of his unsuccess, he said to his wife, "*Tu vois bien, Sophie, qu'il faut que je laisse pousser mes moustaches, on dirait que je me rase pour entrer à l'Institut.*" Perhaps M. Dandet is not quite wrong in his estimate of "Les Immortels."

Of Rude's work as a sculptor M. Bertrand speaks enthusiastically. He considers the "Mercure rattachant ses Talonnières" superior to the "Mercury" of Jean de Bologna. In this I cannot agree, nor in M. Bertrand's estimate of Rude's other works, for his classical subjects always strike me as resembling Canova's namby-pamby gracefulness; and his religious ones, Thorwaldsen's false sentimentality. What can be weaker and more maudlin, for example, than his "Baptism of Christ" in the church of the Madeleine, Paris? and, although his "Départ des Volontaires," on the Arc de Triomphe, has a certain grandeur in the "movement," it decidedly approaches clap-trap. The *Salons* for the last eighteen years have contained "Libertés" innumerable, grander in effect and far less shrieking. Again, what can be more hideous than the "Napoléon 1er s'éveillant à la Posterité," in the Parc de Fixin. A plinth, upon which rests a rock and an eagle in the agony of death; at the summit Napoléon sleeping upon a bier, all but covered with a sheet. — Can a subject be more utterly unfit for sculpture? Perhaps Rude's best work is his recumbent statue of Cavaignac in the Montmartre Cemetery, which has something of the feeling of the Renaissance sculptors. But when M. Bertrand places such work upon a par with the grand tombs of Louis XII, by Jean Juste; of Henri II, by Germain Pilon, and of François I, by Philibert Delorme; or with the works of Jean Goujon, of Michel Columbe, of Ligier Richier, of Jean Cousin, of Simon Guillain, of Pierre Bontems, of François Anguier, or of Franqueville or Prieur, one cannot help wondering if, for the moment, he forgot what these great men of the French Renaissance have left behind them. Even amongst the moderns, surely the work of Bouchet, of Carpeaux, of Chapu, of Paul Dubois, Falguière, Guillaume, Moreau-Vauthier and of many others, quite equals or excels that of François Rude. Whether Rude would have made a better design for the completion of the Arc de Triomphe, than that which was temporarily placed upon it some years ago by Falguière, is very doubtful — but M. Bertrand, no doubt, thinks otherwise. But if one cannot agree with the author in his estimate of Rude as an artist, we may endorse his views upon the man and the teacher: "*Ne craignez pas qu'on vous reproche vos œuvres de débutants si gardez vous d'en rougir jamais vous-mêmes, pourvu que vous fassiez toujours de votre mieux. . . Pourvu qu'elle soit vraie, conforme à la nature, une œuvre aura toujours ce qu'on est convenu d'appeler, sans trop se rendre compte de ces mots énigmatiques, le style et le caractère; substituer à la nature l'imitation d'autrui, les procédés d'école, c'est effacer les différences des hommes et des œuvres, et répandre sur tout ce que l'on fait ce vernis d'uniformité qui est l'opposé du style qui est l'homme même avec ses qualités et ses défauts personnels, l'opposé du caractère qui est précisément le résultat de l'individualité de l'artiste fièrement maintenue dans sa vie et affirmée dans son œuvre. . . . Plus une œuvre serrera de près la nature, plus elle sera décorative et monumentale; Voyez le Parthénon.*" These are sentiments which every one in our own day will echo, and which are the doctrine of modern realists: "*Au fond, l'art ne s'ajoute pas à la nature: il la comprend, l'imite et l'interprète.*"

S. Beale.

[1] "*François Rude*," par Alexis Bertrand. [Librairie de l'Art, cite d'Antin, 29, Paris.

BUILDING LAW.

THE FINAL PAYMENT CLAUSE IN BUILDING CONTRACTS.

IT has been suggested to us by an architect of this city that a synopsis of the lien laws of the different States and Territories — in so far as they affect the time for the final payment of building contracts — would be of great use to such architects as have occasion to draw contracts to be executed in other States.

We have accordingly prepared the following schedule of what, in our opinion, after careful examination of the various statutes, is the longest time allowed for the filing of liens against real estate by sub-contractors, material-men, or other persons furnishing labor or material to the principal contractor:

Alabama,	4 months.	Nebraska,	4 months.
Arizona,	60 days.	Nevada,	30 days.
Arkansas,	90 "	New Hampshire,	60 "
California,	30 "	New Jersey,	1 year.
Colorado,	40 "	New Mexico,	60 days.
Connecticut,	60 "	New York,	90 "
Dakota,	6 months.	North Carolina,	1 year.
Delaware,	90 days.	Ohio,	60 days.
Florida,	6 months.	Oregon,	30 "
Georgia,	3 "	Pennsylvania,	60 "
Idaho,	30 days.	Rhode Island,	6 months.
Illinois,	3 months.	South Carolina,	90 days.
Indiana,	60 days.	Tennessee,	4 months.
Kansas,	60 "	Texas,	6 "
Kentucky,	60 "	Utah,	60 days.
Maine,	30 "	Vermont,	3 months.
Maryland,	60 "	Virginia,	30 days
Massachusetts,	30 "	Washington Territory,	60 "
Michigan,	60 "	West Virginia,	60 "
Minnesota,	90 "	Wisconsin,	6 months.
Missouri,	4 months.	Wyoming,	60 days.
Montana,	90 days.	District of Columbia,	3 months.

In Mississippi the time is six months if the amount is over $150. In Iowa and Louisiana, and in Mississippi for amounts under $150, there is apparently no time fixed for filing liens in favor of the owner, though purchasers and mortgagees are protected if the lien is not filed within a certain time.

It is probable that in some of the States where the longer periods obtain, it was not the intention of the Legislature to give to laborers and material-men such extended time; but, we have constructed the schedule according to what seems to us to be the most unfavorable interpretation of the law from the owner's standpoint, with a view to fixing such time for the final payment as shall without any question protect the owner against the claims of all parties other than the original contractors. The time that original contractors, that is, all parties dealing directly with the owner, have for filing liens, is, in some States, different from that given to sub-contractors and others; the owner, however, can protect himself against a claim of lien from all persons with whom he deals directly by requiring a release of all claims on the property before the contract is finally settled. The time for the final payment need not be deferred beyond the last day on which it is possible for third persons to file liens against the property.

The contract should, however, provide that the final payment shall not be due for a period exceeding by a few days the time allowed sub-contractors for filing liens; as the exact day when a building is actually completed, or work on the contract ceases, is often a matter of dispute. It is best to defer the final payment until five or ten days after the time apparently open for filing liens has expired.

The following is submitted as a final payment clause for use in contracts to be executed in Massachusetts; and the same will hold good for other States with the necessary change as to time indicated by the above schedule:

"$—— thirty-five days after the said work shall have been completed in accordance with the terms of this contract; provided, further, however, that no liens shall then have been filed against the property and remain undischarged, and that said contractor shall tender to the owner a satisfactory release under seal of all claims on his part against the owner's estate, and shall also (if requested) furnish satisfactory vouchers, receipts or other evidence that no claim against the said estate can be made by any person or persons who have furnished labor or materials for the work embraced in this contract."

COMMUNICATIONS

THE HARLEQUIN GORGEOUSNESS OF GREEK ARCHITECTURE.

PHILADELPHIA, PA., January 25, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — I wish to call attention to an unfortunate paragraph in your review of the "League" exhibition in this week's *Architect* (January 19) in which your correspondent attacks Grecian architecture in such a hasty and unappreciative manner.

It is, perhaps, a human failing to slight and misunderstand that which one is prejudiced against, but the prejudice in this case is so glaring *in itself* and withal so conspicuous in the midst of a criticism characterized by such conscientious aggressiveness and expressed with such simple force that it should not, I think, pass unchallenged.

If your author will take the trouble to look up the subject of Grecian temples he may have occasion to reverse his decision as to their "harlequin grotesqueness" as well as to Mr. Brown's originality in drawing his Caryatid porch without any frieze.

Very truly, HERBERT P. KELLY.

[THE writer of the article on the League Exhibition protests against being accused of a prejudice against Greek architecture. As to Mr. Brown's Caryatid porch, while he can certainly claim that the Erechtheum portico has no frieze, the profiling of the mouldings, together with the special treatment of the upper face of the architrave, give it an effect quite different from his design, although it is not perhaps settled whether even the Erechtheum portico had not once a frieze of some sort. The main question, however, whether the appearance which the Greek architects intended their buildings to have was that of "cold purity," "pure intellect," "abstract form," and so on, as the sentimentalists of the early part of the century maintained, or of "harlequin gorgeousness," (not "grotesqueness,") is best answered by referring to the works of Penrose, Hittorff and Zanth, and many others. Our older readers will well remember the commotion which was caused by the first publication of the result of explorations which showed that all the important buildings on the Athenian Acropolis retained traces of having been painted. It was announced, by those who professed to have the most profound intuition into the workings of the Hellenic mind, that a Greek was incapable of profaning the purity of his Parian marble by covering it with pigments, and that the traces of color upon it were due to the loathsome levity of the Slavonic conquerors during the dark ages, who daubed with gaudy paint the buildings whose "calm intellectuality" they were incapable of comprehending. This theory greatly comforted the sentimentalists, until it was shown that the early Doric temples of Magna Græcia, which no mediæval barbarians had ever approached with their paint-pots, had not only been painted all over, but had been prepared for painting when they were built by the application of a film of stucco to the stone, to form a ground for the pigments. In all important respects the coloring and the patterns agreed with the traces remaining on the Athenian buildings, and subsequent researches have only confirmed, what was already amply proved, that the Athenian temples in the time of Pericles had their delicately profiled mouldings speckled and dotted and streaked with blue and red; that the sculpture upon them was set forth by a blue background, and that the walls and columns were painted in broad stripes and bands, of the most vivid tints. Whether the Greeks showed proper respect for the theories of their future eulogists in behaving so it is unnecessary to inquire. We know now beyond a doubt what they did, and the sooner we accommodate our ideal of them to the facts, the better off we shall be. Unless the building has been repainted recently, the most life-like reproduction of a Grecian Doric portico, as it appeared when its builders left it, is probably to be found in the entrance porch of the Cirque d'Eté, in Paris, an architectural object to which the term of "harlequin gorgeousness" is about as well applied as to any structure we know of. To the writer's mind, the abandonment of the idea that the Greeks were nothing but "cold idealists" greatly improves their position as artists. It is doubtful whether their coloring would appear beautiful to an Oriental, or even to us, but it would have been a strange insensibility that would have made the statue of Athene inside the temple of ivory, inlaid with gold, and left the gods and heroes in the tympanums and the metopes outside to shiver in white marble. We are so accustomed to see our buildings bare, and are, possibly, so sensitive to color, that we have formed a dislike to the idea of exterior polychromy which the ancients or the mediævals could not conceive, and which would quickly disappear if some genius should produce a really successful example of it. If architects who consider a scaling uniform white the proper color for the highest effects of architecture would read Chipiez's description of Diana's coral temple, and the iron sanctuary of Mars, they would get some suggestions as to the value that color might have in architecture which ought to furnish them with food for thought. — THE WRITER OF THE ARTICLE.]

BOOKS.

WILKES-BARRE, PENN.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly let me know through the medium of your paper, what are the best works treating of "Southern Romanesque," also on theatre construction, where I can get them, and the price. You will greatly oblige,

Yours respectfully, L. H. DAVIS.

[(1.) REVOIL'S "*Architecture Romane du Midi de la France*"; Corroyer's "*L'Architecture Romane.*" (2.) Gourlet's "*Traité de la Construction des Theatres.*" (3.) Any importing bookseller will obtain them for you. — EDS. AMERICAN ARCHITECT.]

THE FIRE ON THE HEARTH STOVE.

BOSTON, MASS., February 4, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Can any one tell me whether the Fire-on-the-Hearth Stoves, once manufactured by the Open Stove Ventilation Company, in New York, are still made, and if so, by whom, and what is the address? I have used half-a-dozen or so in my practice, and would have used many more, probably, if it were not for the extreme difficulty of getting them. The last one I bought I heard of, after many inquiries, at Salem, Mass., and, secured it, but this seems to have been the sole survivor of the race, and what I shall do when I am next applied to, to recommend a nursery stove, or to get pieces to repair those I have already bought, I do not know.

A NURSERY ARCHITECT.

NOTES AND CLIPPINGS

HOW TO WRITE FOR THE PAPER. — There are not a few scholars, fitted for even the Chair of Rhetoric, who are sadly uninformed in the matter of writing for a newspaper. Possibly they could write a book, but their communications must receive a little — often a great deal — of "doctoring" before they are put into the hands of a periodical compositor. Of course the grammar will usually — by no means uniformly — be satisfactory. What they err in pertains mainly to the mechanical make-up of the manuscript. We note a few particulars where a long experience has discovered amazing defects.

(1.) Abbreviations are an abomination. No one who really knows "how to write for the paper" ever gives "Pres." for President, or "V. Pres." for Vice-President, or "Thurs," for Thursday. Certain abbreviations are established and printed as such — "Mr.," "Hon.," "Mass.," "Esq.," for examples. But when it is expected that the

compositor will put in every letter of a word, those who know "how to write for the paper," will *write out* every word. In editorial offices where the incumbent feels at liberty to be autocratic, the sight of an abbreviation is the occasion of instant doom. More humble, we usually fight down a vexation and fix the manuscript.

(2.) It seems a small thing to complain of the writing on little bits of paper. Marriage notices often come on slips less than the size of one's hand. These we must stick to a bigger sheet, else the danger of its blowing away is imminent. Nothing should be put on a sheet of less size than note paper. We are always glad when the size is that of letter-sheet. Of course we make no complaint of postal cards.

(3.) Paragraphing is largely arbitrary. It ought to have regard to the physical appearance. Some of the English newspapers will give a whole column without a break. Of course the paragraphs should be made where the sense requires it; and also — provided the sense is not disturbed — with a view of the mechanical appearance. But our special point is, that one who "knows how to write for the paper" *will himself indicate* — and distinctly — where the paragraph is to begin. We should say that the frequent failure to do this is stupid, but for the fact that intelligent people are often thus negligent.

(4.) In most newspaper offices a manuscript is often given in parts to different compositors. Therefore but one side of the sheet should be written upon.

(5.) In this age paper is cheap. We hate to see a communication without a title, and with the first line so near the top that the editor, guessing what the proper title is, must get a new sheet on which to write it. Be generous in the use of paper.

(6.) Sometimes a news item, a marriage notice, and a business matter will be crowded in on the same sheet. Then they must be re-written, or else scissors and paste must be put to use in getting them apart. Every separate matter should be written on a separate sheet.

(7.) Finally — for ministers especially — care should be taken in reference to Scripture citations. Absolutely *full half* the references to chapter and verse are erroneous! Further, the quotation is almost certain to contain an omission or other mistake! This statement may seem incredible. But we, who know by much observation, speak by authority.

We might extend this inventory of things which those who "write for the papers" need to know, and knowing need to practise. But for the present let these seven particulars suffice. — *Christian Leader.*

THE NEW PEH-TANG CATHEDRAL. — The new cathedral in Pekin, which is to take the place of the Peh-tang, removed two years ago from the neighborhood of the Imperial Palace, after having for many years excited the irritation of the Chinese, is now complete externally, and was consecrated on December 8. Abbé Faivre of the Lazarist Society designed the edifice and superintended its construction. The internal decorations remain to be completed and will take several months. The organ is described as a masterpiece of Cavaillé de Col of Paris, and the painted windows, which are also fine works, are in their places. The glass, which was brought from France, arrived in Pekin in excellent order. The building is not so large as the granite cathedral in Canton. The total interior length is 248 feet; breadth of transept, 108 feet; breadth of nave, 82 feet; height under the beams, 70 feet; height under the arched roof, 90 feet. The height was fixed in a convention between the Chinese Government and the Lazarist Mission, and one of the conditions imposed was that there should be no tower. These conditions added to the difficulties of the architect, but he is said to have overcome them, and the design is pronounced "noble, harmonious, and beautiful." It is said that the Chinese Government were to send representatives of high rank to take part in the ceremony. "As by the cession of the mission's former site in exchange for the grounds now occupied a troublesome and even dangerous question has been laid finally at rest to the perfect satisfaction of the Imperial Court, the Tsung-li-Yamen, and Chinese public opinion — the last an important element in the matter — and, on the other hand, to the satisfaction of the Catholic mission also." — *London Times.*

SEWAGE DISPOSAL BY THE GRAVITATION STORON SYSTEM. — A method of sewage purification, depending mainly on aëration, was described by Mr. W. Kaye Parry, M. I. C. E., in a paper read at a recent meeting of the members of the Institution of Civil Engineers of Ireland. The process, which is the invention of Mr. W. H. Hartland, is as follows: the sewage passes from the sewer into a settling-tank situated some feet below the sewer invert. This tank is constructed in the form of a siphon, and the liquid leaving it rises again to the level of the sewer invert. In this tank a separation of the road detritus and other heavy suspended matter takes place, and the effluent, on leaving the tank, contains only the fatty matter of the sewage and the lighter particles that float on its surface. The liquor is now led through a number of vertical filters filled with broken limestone or chalk, and in its passage is deprived of its greasy matter, whilst its acidity is at the same time neutralized by the lime. After this the liquor enters an aëration chamber, where it is broken up into a finely divided spray, which, in falling, comes in contact with a strong current of fresh air, and carries down with it a large quantity of oxygen. It now passes through another settling-tank, of similar design to the former, in which the precipitation caused by the oxidation takes place. The liquor, however, still contains some of the ammoniacal and nitrogenous elements of the sewage, which are recovered by passing it through a second set of filters filled with charred earthy refuse shale or other suitable material. When a high standard of purity is required it is also filtered through peat. In 1887, Mr. Kaye Parry erected an experimental plant for testing the process at Monkstown, Dublin, the sewage being drawn from a sewer draining certain portions of Kingstown. The first settling-tank was constructed to hold 95 gallons, the neutralizing and filtering tank to hold 160 gallons, and the second settling-tank 124 gallons. All these tanks were in duplicate, to permit the cleansing of one set whilst the other was at work. The power for compressing the air was supplied by a 1½ man-power gas-engine, the air pressure adopted being equivalent to 4 inches of water. The first filter was filled with 315 pounds of chalk broken to pass through a 1½-inch ring, and the second with 328 pounds broken to pass through a ½-inch riddle. The other filters contained 6½ cubic feet of spent shale broken to pass through an 8-inch sieve. In the first set of trials the sewage was passed through at the rate of 1440 gallons a day; this rate, however, it was found advisable to reduce in subsequent experiments to 700, as the sewage was of an exceptionally foul character, containing 158.28 grains of solid matter to the gallon. The trials extended over twenty-five days, and the results obtained were most satisfactory, as samples of the effluent collected in April last are still sweet and free from smell. Experiment showed that 15 grains per gallon of potassium permanganate were required to produce an equivalent degree of oxidation. As the sludge produced during the process is free from chemicals and contains no road detritus, it has exceptional manurial value, analyses showing that 80 per cent of the manurial salts existent in the raw sewage remains in the sludge. — *Engineering.*

TRADE SURVEY

Most of the business in the hands of architects at this time is for house-building. Most of the work is for houses costing from $5,000 to $20,000. Architects in Boston and New York and Philadelphia and Chicago and other large cities have given it as their opinion that there will be large building operations this year, most of them in the suburbs of the larger cities. They also said that in all probability there will be an unusual amount of work done on the cheaper class of houses for laborers and persons of small means. Real estate agents, particularly throughout the West, corroborate these statements and say that their sales of real estate this winter have been much larger than last and far ahead of any season for years past for building purposes especially. A careful consultation of the real estate sales in all our larger cities proves this to be correct. Large plots of land have been selling all winter to New York City for building purposes. Larger transactions have been reported in Philadelphia than for years. The same is true of Pittsburgh, Duluth and other Western Cities. The improving demand for real estate is not of a speculative character. Builders and others have observed that real estate in our larger cities is steadily improving and they have been simply buying sites for building purposes in order to protect themselves against a speculative advance which influences now at work are gradually bringing about. In Chicago it is stated on very high authority that there is an improving demand for desirable sites in both the city and suburban places for house-building purposes and for factory use. There is a considerable increase in the demand for sites throughout the larger cities of Indiana and Ohio, and influences there are working to develop industrial growth, one of which is cheaper coal and to some extent cheaper fuel. Schemes are under consideration which will probably result in the supplying of small manufacturers in the Northern towns of those States with natural gas at a price one-third less than that of coal. Some estimates put the figures at less.

The Standard Oil Company is securing the control of the entire natural-gas region of Ohio, and it will consequently be supposed that natural-gas will be sold at the highest price the traffic will bear. The industrial towns and cities of these three States are growing more rapidly than in any other part of the country. Part of this growth is due to the industrial development throughout the South, where the products of these States are finding increasing sale. The stimulus is also largely due to the filling-up of the Northwest, of which Chicago is the base of supplies. Then these three States are growing in population and wealth very rapidly, with the Lakes on one side, and the Mississippi River bounding them on the west and south. It must be noted, however, that farm-lands in these States are not improving in value, but in many cases declining. Cereal products can be purchased cheaper in the West than they can be grown there, and hence real estate is to be had at prices which are favorable to purchasers for manufacturing purposes. The cities of the Ohio Valley are generally increasing in population and wealth. New iron and steel companies are being organized, and oil-producing companies are also operating there. There are schemes for the laying of several hundred miles of pipe. Railroad companies have their plans completed for the laying of their tracks on both sides of the Ohio, and smaller manufacturers by the hundred are thriving in their little circles from the general activity within and without this region. Throughout the entire West there are growing evidences of an increasing activity in building operations, in mining, in railroad-building, in ship and boat building. The West is becoming gradually more and more financially independent of the East, although a great deal of money is still floating in that direction. The Western States are gradually becoming financial centres within themselves. There is a transfer of capital gradually going forward because of the increasing security of loans and the generally satisfactory rewards secured. Among the prosperous industries of the West are to be noted the paper-makers of Wisconsin, where, within two years last, capital has been more than doubled. New paper-making enterprises are springing up, stimulated by the abundant supply of facilities. Besides this, the demands for paper-making are increasing rapidly, and the freights to markets are much lower than from the Eastern sources of supply.

The lumber trade of Michigan and Wisconsin is good although the increasing supply of lumber from Arkansas, Louisiana and Mississippi is threatening the supremacy of white pine especially in the far Western markets. The demand for Southern lumber products is increasing much more rapidly than Northern. The rates from Southern points are low. The cost of stumpage only a fraction of what it is in Michigan. The facilities for transporting lumber are being improved and it is only a question to experts in the lumber trade, when those who control the Southern interests will control the lumber interests of the entire country. The fancy grades of hard wood are growing in demand throughout the West and speculation is going on in choice Southern lumber territory. The iron and steel makers are still complaining of a backward tendency in the spring demand. Railroad builders are creeping along slowly, prices are steadily declining, two dollars per ton has taken place on steel rails. A Pig-iron Association has been formed with a capital of $2,000,000 which will deal in warrants. Each warrant represents 100 tons which can be used as collateral in commercial transactions. This will probably result in the steadying of the iron market throughout the country and in the carrying of larger stocks as is done in Great Britain. The combination is composed of some of the leading financiers, manufacturers and iron dealers. It has a backing which insures it a success and the trade conditions call for just such a movement. The charges will be about fifty cents per ton per year for iron, and production will be kept under conservative control.

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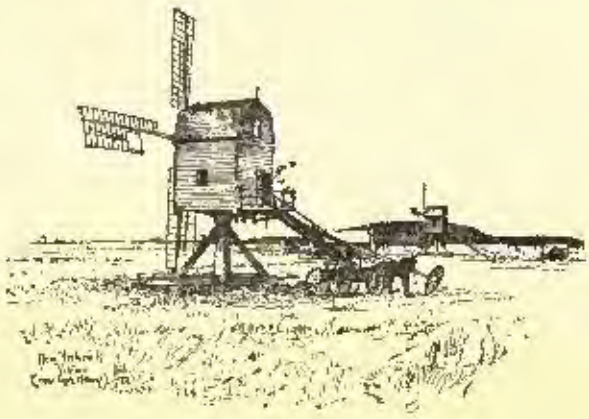

AMERICAN WINDMILLS.

The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Ticknor & Company, Boston, Mass. No. 686.

February 16, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE Western New York Association of Architects held its second annual convention last week, with an attendance of about twenty-five members. The usual questions, about the licensing of architects and the regulation of competitions, were brought up, and informally discussed. Mr. Carlin of Buffalo, the Secretary of the Association, read to the Convention the draft of the bill which is to be presented to the Illinois Legislature, to restrain persons who have not passed a satisfactory examination, before a board appointed by the State, from practising architecture within the State; and a committee consisting of Mr. Carlin, Mr. Dockstader of Elmira, and Mr. Colton of Syracuse, was appointed to consider the advisability of presenting a similar bill to the New York Legislature. Another committee, consisting of Messrs. Curtis of Fredonia, Marling of Buffalo, and Walker of Rochester, was appointed to consider the subject of uniform contracts; and the committee on competitions was continued for the purpose of enabling it to draw up a set of propositions in regard to such matters, which it proposes to have adopted by the Association as suggestions, rather than fixed rules. We suppose it is needless, at this day, to point out the advantage to the profession of such discussions. Although the topic of competitions is tolerably well worn in the deliberations of architects, and that of the regulation of practice hardly less so, some advance is made every year in both of them. About ten years ago, the Boston Society of Architects had a "Tract on Competitions" prepared, presenting the principles for which the profession has fought so long. As a tract, it was interesting, and convincing, to architects, but the idea of attempting to induce the public to conform to it was at that time almost ridiculous, and we doubt whether many copies were circulated, unless as curiosities, outside of professional circles. A few years afterward the English architects, under the lead of a group of resolute and distinguished men, joined in a movement to establish public competitions on a satisfactory basis, which soon secured the adhesion of nearly every respectable architect in Great Britain, and has already completely transformed the relation of architects to important public work. After the formation of the Western Association of Architects in this country, the leaders of that body took early occasion to secure an emphatic expression of opinion on the subject; and now the State and local societies seem to be in a fair way to finish the work by the adoption of rules which will be binding on their own members, and will soon become familiar to the comparatively limited public with which each society deals. The Missouri State Association has already formally adopted the principles generally approved in the profession; the Boston Society has done the same, and has issued a new pamphlet of rules and suggestions, of which each member receives a number of copies, for distribution where they may be needed; and if the Western New York Association, followed by the others, will do the same, the battle for justice and fair treatment will be nearly won.

SOME of the people in Rhode Island are beginning to be sorry that they passed a new lien law last year, giving material-men a lien, without notice to the owner, and sixty days in which to file the claim. A certain school-house has just been completed in East Providence, under the direction of Messrs. W. R. Walker & Son, as architects, and the full contract price, together with a trifling sum for extras, was promptly paid to the contractor, a man named Moulton, after the completion of the structure. About two weeks after the final payment to the contractor, Messrs. J. B. Gurney & Son, Fred E. Hovey, and J. C. Dodge & Son filed liens for materials furnished to Moulton, to the amount of five hundred and twenty-two dollars and some cents. No bonds were required of the contractor, and as he has just assigned his wages, and mortgaged his personal property, it looks very much as if the town would have to pay the amount of the liens, with costs. Naturally enough, the taxpayers blame the School Committee, or rather, the Superintendent of Schools, who was delegated by the committee to attend to the matter, for paying the contractor in full before the time for filing liens had expired, and the Superintendent transfers the blame to the architects, who, as he says, gave Moulton certificates, on receipt of which he was bound to make payments. The truth appears to be that neither was much to blame, if at all. Moulton, it seems, went to the architects, saying that the Superintendent wished them to give him a certificate for a certain amount, and they, knowing that matters of payment are very often, much too often, in fact, arranged between the builder and the owner, or the representative of the owner, without consulting the architect, believed what he said, and gave the certificates, looking out that they did not exceed the contract price, and undoubtedly supposing that the Superintendent would take the necessary precautions to protect the town against liens. On his part, the Superintendent probably supposed, as he says, that the architects' certificate amounted to an order to him to pay the sum mentioned at once, without inquiry or reserve. Of course, we know that this is an error, the architect's certificate being simply an expression of his opinion that the money is due, which imposes no obligation upon the owner to make the payment if he has reasons, which may have been unknown to the architect, or forgotten by him, for not doing so, but it is a very common error, and the novelty of the law, under which this seems to be the first case, probably helped both parties to forget it. The next time that the town builds a school-house, it will probably require bonds from the contractor; and we advise architects who may be called upon to practise in Rhode Island to draw their contracts in such a way that a sum ample to cover all possible liens, for materials or wages, may be reserved until the time within which they can be filed shall have expired.

A GERMAN engineer has published some observations on the most efficient method of excavating streets in frosty weather, which we find copied in two or three of the foreign technical journals. Every one knows the difficulty of making any impression with ordinary tools on frozen ground, and a surface protected with paving-stones is even more intractable than ordinary material. Unless fires can be lighted over the line of the proposed trench, so as to thaw the ground beneath them, the usual way is to pick, painfully and slowly, into the hard, tough mass until a sufficient depth is reached, or the frozen stratum is penetrated. According to Herr Schindler, who has carried his theory into successful practice, much of the labor incidental to such work may be saved by considering that the ground does not freeze all at once into a homogeneous mass, but by successive stages, which produce a stratified condition, something like that of sandstone or limestone. If the work is carried on vertically downward from the surface, the material, whether of stratified stone or frozen earth, must be removed in small particles, while, by

taking advantage of the stratification, and working horizontally from a shaft or an exposed face, the material may be split off in large pieces through the seams between the strata. Where earth has been filled-in, the strata do not always lie horizontally, but may follow the surfaces of successive deposits of material. Such cases are, however, easily distinguished, and with a little care on this point, after a pit has been sunk in the spot where the excavation is to begin, the operation may be continued rapidly and successfully by means of iron wedges, long and short, which are driven horizontally as the work advances, and lift and break up the frozen earth in large sheets until the necessary depth is attained.

SOME good people in Remscheid, in Rhenish Prussia, have recently carried out a cooperative building scheme on rather a new plan. Remscheid is a town of fifteen or twenty thousand inhabitants, who occupy themselves principally in blacksmith work, making, with the help of forges set up at their homes, small wrought-iron articles, which are shipped to all parts of the world. The managers of the new enterprise began their work with the sensible step of ascertaining the exact rents paid for the existing tenements by the persons whom they wished to aid in securing houses of their own. For this purpose, they distributed circulars through the quarters inhabited by working people, asking each householder who might receive one to give, over his signature, the number of persons in his family; the number of rooms occupied by them; the rent paid; the amount of land attached to the house, and so on. Six hundred and forty-seven circulars were returned, properly filled out. From these, which certainly presented a tolerably reliable view of the condition of the working-people of the town, it appeared that the most expensive tenements were those in the immediate neighborhood of the railway station, which brought about twenty dollars a year per room, without water-service, or twenty-three dollars with water-supply. The attics in the same houses brought about two-thirds the rent of the first and second story rooms. Tenements at some distance from the centre of the town brought, for the first and second story rooms, about two-thirds the rent of the more conveniently located ones, while the rent of the attics was very little less. In the outlying districts the average rents were about one-half those in the middle of the town. In regard to the number of rooms occupied by each family, it appeared that the people intelligent enough to reply to the circulars lived, on an average, two in a room. One hundred and twenty-one, out of the six hundred and forty-seven persons who answered, said that their families slept three in a room, on an average, and in twenty-six cases there were four or five persons to a room. A comparison of the rents paid with the cost of the houses mentioned in the replies, including the value of the land on which they stood, showed that they brought in an average return of about eleven per cent a year above expenses; and in some cases the income was as much as fifteen per cent. As the account, which we find in the *Deutsche Bauzeitung*, justly says, these facts showed plainly that there was not only need of cheap and wholesome houses for workingmen, but that the rents which they would command would pay a good interest on the cost. A company was, therefore, formed, with a capital of forty-four thousand dollars, land was bought in several different quarters of the town, and the construction of houses commenced. The constitution of the company was much like that of similar corporations here, the liability of each stockholder for the debts of the company being limited to the value of his paid or secured interest in its property, and the administration being placed in the hands of officers elected by the members. At present, the company builds houses either for sale or rent, or buys them, to sell again, where this may seem advisable. Of those built by the company, some are detached, and some "semi-detached," as the English say, or "double," to use our word. A single house sells for fifteen hundred dollars, to which one hundred and fifty is added if a blacksmith's shop is attached to it. One-half of a double-house brings twelve hundred and fifty dollars. If a member wishes to hire a house, instead of buying it, he pays six per cent, not, on the value, as rent. By paying seven per cent, he is entitled to have two per cent set aside as a sinking-fund, leaving five per cent as the net rent. When the sinking-fund reaches one-third of the value of the house, a deed of it is given to the tenant, who becomes thenceforth responsible for the insurance, taxes and repairs. The remaining two-thirds of the value, which is secured by a mortgage on the property, is provided for by requiring the new owner to continue paying five per cent on the full value. Three per cent of this goes as interest on the mortgage, while the remaining two per cent constitutes a new sinking-fund for the extinction of the principal. For the other provisions adopted by the company we must refer persons interested to the original article, or rather, series of articles, or to their author, Herr Walther Lange, Remscheid, Rhenish Prussia. Besides the preliminary collection of statistics, on which to base the work, which strikes us as a particularly commendable idea, the course of the company in buying lots scattered through various parts of the town seems on some accounts very judicious. Among us, certainly, the idea of living in a vast *cité ouvrière*, composed of nothing but small houses, is neither so attractive nor so wholesome for a modest citizen and his family as the consciousness that the handsome mansion of his richer neighbor is not far off, and that it is worth an effort on their part to keep their cottage dainty and attractive, and to look after the appearance and manners of the children, so that they may not suffer by comparison with the carefully trained young people near by; while the corporate property, scattered in this way, is much less likely to suffer serious depreciation in value than if concentrated in a large area, which may be rendered nearly worthless by the establishment of some offensive manufacture near by.

THE French tribunals have made up their minds that the stringing of wires over a house is an injury to the proprietor of the house, for which he should be paid; and we hope that some time the courts of certain commonwealths nearer home may come to the same conclusion. An electric-lighting company, finding that the shortest route for its wires to a place which it wished to reach was over the roof of a house, proceeded, as such companies generally do, to string them across it, without asking the owner's leave. In this country the company would probably have put up poles and frames on the roof, or would have fastened the wires to a chimney, without paying any attention to the protests of the proprietor, but in France the right, or the habit, of appropriating other people's property is not so highly developed as here, and it ventured only to place supports on the neighboring buildings, so that the wires swung free over the house in question. The owner, however, chose to consider the wires an annoyance, and sued for an order to have them removed, and for damages for the injury they had already done him. The company resisted, on the ground that the owner of the house under the wires had no rights in the space through which they were stretched, and that moreover, they did him no harm. The court decided that the ownership of a piece of ground carried with it the ownership of all the space above it capable of being utilized. As to the damage caused by the wires, it held that the possible danger from the current to persons in the house, even if it existed only in imagination, was an injury, while the sound of the wind through the wires was a real annoyance, and the necessity for allowing workmen to walk over the roof, together with the chance that the wires might be broken by a storm, and trail over the tiles, constituted a risk of damage which would not exist if the wires were not there. For these reasons, it ordered the immediate removal of the wires, but decided that the complainant had not, up to the time of the trial, suffered enough injury to give him an appreciable claim for damages.

THE *Wiener Bauindustrie-Zeitung* gives a recipe for a paint, to be applied to woodwork exposed to the weather, which, it says, is proof against all ordinary influences, and is tolerably cheap. No oil is used, but, for the first coat, finely-ground zinc-white is rubbed up with lime-water, and the objects to be painted covered with a good coat of the mixture. When this is dry, which will be in two or three hours, a second coat is applied, composed of a solution of chloride of zinc in lime-water. By the action of the chloride on the oxide of zinc a smooth, shining coating is formed, which is extremely durable, and the paint may even be used, instead of tar, to protect the ends of wooden posts in the ground. Another durable paint, which has the advantage of rendering wood covered with it fire-proof, is composed of one part each of salt, alum, silicate of soda and tungstate of soda, with four parts of lime, mixed, and ground in linseed-oil. Three coats of this paint make a wooden object incombustible, and it is said to last for thirty years exposed to the weather.

ON THE TESTING OF BUILDING STONE.[1]

THE problem of ascertaining the suitability of a stone for any form of structural application is one peculiarly complicated and difficult. Briefly put the question is simply this: By what methods in the laboratory is it possible to ascertain within the space of a few days or weeks the relative strength and durability of any stone for as many generations or even centuries.

In order that the difficulties involved may be fully appreciated, let me present the main points to be considered. In the order of their importance — as I believe — they are:

1. Resistance to changes in temperature.
2. Resistance to the chemical action of an acid atmosphere.
3. Durability of color.
4. Crushing strength and elasticity.
5. Resistance to abrasive action of feet and wind-blown sand.

The order as given above may be subject to modification to suit individual cases. In many instances the actual strength of the stone is a matter of little importance, and in protected situations the qualities mentioned under (3) and (5) may be of no essential value. In still other cases, as in bridge abutments, strength and elasticity are matters of greatest import, while that of change of color can be left wholly out of consideration. In the arrangement given above I have had especial regard to stone exposed in the exterior walls of a building, and in a varied climate like that of the Northern and Eastern United States.

Before proceeding to a discussion of methods by which these essential qualities can be estimated, let me call attention briefly to the peculiarly trying conditions under which a stone thus exposed is placed, and offer a few criticisms on the methods now commonly employed.

None of the conditions under which a stone is commonly placed are more trying than those presented by the ordinary changes of temperature in a climate like that of our Northern and Eastern States. Stones, as a rule, possess but a low conducting power and slight elasticity. They are aggregates of minerals more or less closely cohering, each of which possesses degrees of expansion and contraction of its own. In the crystalline rocks these dissimilar elements are practically in actual contact; in the sandstones they are removed from one another by a slight space occupied wholly or in part by a ferruginous, calcareous or siliceous paste. As temperatures rise, each and every constituent expands more or less, crowding with resistless force against its neighbor; as the temperatures decrease a corresponding contraction takes place. Since with us the temperatures are ever changing, and within a space of even twenty-four hours may vary as much as forty degrees, so within the mass of the stone there is continual movement among its particles. Slight as these movements may be they can but be conducive of one result, a slow and gradual weakening and disintegration.

The effects of moderate temperatures upon stone of ordinary dryness are, however, slight when compared with the destructive energies of freezing temperatures upon stones saturated with moisture. At a temperature of 30 degrees Fahrenheit the pressure exerted by water passing from a liquid to a solid state amounts to not less than 138 tons to the square foot, or as Professor Geikie has strikingly put it, is equal to the weight of a column of ice a mile high. Is it, then, astonishing that a porous sandstone exposed in a house-front to be saturated by a winter's rain and then subjected to temperatures perhaps several degrees below the freezing point shows signs of weakness and exfoliation after a single season's exposure?

Since then, as every quarryman knows, no stone however strong can endure the enormous strain it would be subject to if frozen solid when holding any considerable amount of water confined within its pores, it is but natural to conclude, as a matter of course, that other things being equal those stones are most durable which will absorb and retain the least moisture. This rule is not to be accepted, however, without a considerable grain of allowance, since a coarsely porous stone, though capable of taking up a large amount of moisture will also part with it readily, or if frozen while saturated will permit a considerable proportion of the expansive force of the solidifying water to be expended otherwise than in pushing apart the grains composing it. Otherwise expressed, the water will *freeze out* of a coarsely porous stone, while in one that is compact it may create sad havoc. This is well illustrated by the common occurrence of water freezing in straight cylindrical or widely-expanding vessels, and in narrow-necked pitchers and bottles. In the first instance the open space above is sufficient to allow all the expansion to take place vertically. The narrow-necked vessel, on the other hand, is almost invariably broken.

Still other objections to a porous sandstone than its liability to disintegration on freezing may be given. A stone front, while undoubtedly imposing, may become saturated by prolonged rains, and actually hold tons of water. This in cold weather is slow in evaporating, and must render a house damp, requiring a larger outlay of fuel to render it comfortable. This matter is, in part, remedied by building double walls, the inner of brick. In our climate a stone house constructed otherwise would be well nigh uninhabitable. Moreover, a porous sandstone is, of all stones, most likely to afford foothold for the growth of algæ, lichen and mosses. While it is yet to be proved that these growths are in themselves actually injurious, they are, at least, suggestive of an unhealthy dampness. A stone covered by these organisms will absorb more water and give it up more slowly to evaporation than one whose surfaces are not thus protected.

To ascertain, then, the porosity or ratio of absorption of any stone is an important test; to ascertain the ratio of absorption and resistance to freezing while saturated is a most important, and for a single test the most conclusive of any one test yet suggested. Nevertheless, it is a matter which at present is almost wholly ignored. I will refer later to methods which have been employed to some extent in times past.

The second essential quality, that of resistance to atmospheric chemical agencies, is also one that architects, as a rule, ignore. Like the last, it needs, therefore, to be enlarged upon.

The atmosphere in its normal state consists of a mechanical admixture of nitrogen and oxygen in about the proportion of four volumes of the former to one of the latter, together with minute quantities of carbonic acid, ammonia and vapor of water. In the vicinity of large cities, however, it carries in addition to increased quantities of carbonic acid appreciable amounts of sulphurous, sulphuric, nitric and chlorhydric acids. These, when brought by rains in contact with the walls of buildings are capable throughout many years of time of producing marked results, especially when aided by the extreme diurnal ranges of temperature already alluded to. Carbonate of lime, the material of ordinary marble and limestone is particularly susceptible to the solvent action of these acids, even though they may be present in extremely minute quantities. Of all stones the unerystalline limestones are most readily affected; the crystalline, if equally compact a trifle less so, and a dolomite still less. It does not necessarily follow, however, that a dolomite will be the more durable, since the questions of texture and tenacity come in for consideration. In the unerystalline limestones the effects of an acid atmosphere are, perhaps, less noticeable since these stones are not, as a rule, used in finely finished work. The crystalline limestones (marbles) often suffer severely, however. Professor Geikie found that slabs of marble exposed in the climate of Edinburgh lost their polish within the space of a year or two, and became completely illegible within a century.

Professor Julien found that in the city cemeteries about New York the polish on marble tombstones did not often survive over ten years. The writer's own observations on the subject are to the effect that in the cemeteries of the smaller cities and towns of New England marble tombstones will retain their polish for a period of from ten to fifteen years, and up to twenty-five or thirty years will present no signs of disintegration of a very serious nature. Beyond this time the surface becomes rough and granular, and the edges of the stone may be found filled with fine rifts in which particles of dirt become lodged or lichens take root, giving it a dirty and unkempt appearance.

It is to this ready solubility of calcic carbonate that is also due, in large part, the poor weathering qualities of sandstones with calcareous cements. The calcite is slowly removed by solution; the siliceous grains thus become loosened, and falling away under the influence of wind and rain expose fresh surfaces to be acted upon. Certain of the ferruginous cements are likewise susceptible to the influence of the acidulated rains; though the anhydrous oxide, as it exists in the Potsdam stones, is said to be less soluble than the hydrated oxide occurring in those of Triassic age.

The third essential quality which I have mentioned is that of durability, or permanence of color. Here, again, the chemical action of atmospheres are to be contended with. The possibility that a stone may contain certain constituents which on exposure to the atmosphere will undergo certain chemical changes productive of a simultaneous change in color is apparently not fully realized. No better illustration of the prevailing ignorance on this point — unless indeed it was due wholly to gross carelessness — is needed than that presented by the exterior basement wall in the new capitol building at Albany, New York. These are built of a light, and in its fresh state, uniformly gray granite. On exposure the numerous included particles of pyrite (iron disulphide) underwent oxidation and in many instances the whole face is so disfigured by blotches of iron-rust as to be very unsightly. Iron in the form of disulphide, protoxide or carbonate is the prime factor in producing color changes in all stone used for architectural purposes. As is well known many a light gray sandstone turns buff or reddish after short exposure in an outer wall. This is brought about through the oxidation of some one of the above-named ingredients. If the resultant tints are uniform the effects are not always objectionable, and indeed are often beneficial. The *mellowing* of a stone with age is due mainly to changes of this nature. If, however, the oxidizing mineral occurs irregularly disseminated in streaks, nests or bunches, the color often appears in dirty blotches

[1] By George P. Merrill, Curator in the National Museum at Washington.

and utterly ruins otherwise beautiful work. While on the whole the presence of an easily oxidizable mineral may or may not be objectionable in the fragmental rocks it is always prejudicial in the crystalline marbles and the granites. It is the presence of finely disseminated pyrite, protoxide or carbonate of iron that renders so unsafe the selection of certain lime and sand stone from below the water-level in the quarry-bed. As there displayed the stone may be beautifully and uniformly dark bluish gray, or drab. The same stone quarried and put in the walls of a building becomes, owing to oxidation, of dull yellow or brownish hue.

Crushing strength and elasticity.—If we are to judge from the ordinary modes of procedure the crushing strength of a stone is considered by architects and engineers in general as the one essential quality. Scarcely a public building of any importance is erected but a long series of crushing tests is inaugurated at a considerable outlay of time and consequent expense. These tests are applied to rectangular blocks of all sizes and with ever-varying results, and this in the face of the fact that there is to-day scarcely a stone upon the market that will not bear at least fifty times the pressure likely to be demanded of it under any but the most exceptional circumstances. The stone in the bottom courses of the Washington monument, in this city, and that bears the entire weight of the superincumbent 550 feet, is a stone so weak and of such poor weathering qualities as to be practically out of the market, yet its pressure-tests will show a strength many times greater than will be required of it under the most trying conditions of wind and weather. Indeed, I have yet to learn of a single instance in which a stone built into a wall has become crushed through any inherent weakness of the stone itself. Blocks have become broken, or scaled on the edges through unequal settling of the foundation or improper bedding, but the number of instances in which a stone properly laid has actually crushed through inability to withstand the strain are, I believe, so few that they may almost wholly be left out of consideration. In short we may safely take it for granted that the majority of stones are fully strong enough for all ordinary structural application. What is desired is not a knowledge of its actual strength to-day but rather its power to resist for a century and more the severe trials above enumerated. The tests as now applied will give no clew to this, whatever.

The elasticity of a stone is, I believe, a matter of much greater importance. It will be remembered that it was found necessary not long ago to substitute iron in place of the stone towers of the Niagara Suspension Bridge. The original towers were of an impure magnesian limestone with seams of gypsum. Under the constant strain from the bridge and loaded trains this gradually became filled with rifts and cracks, rendering necessary their replacement by other material. Pressure tests would have shown the stone to have originally possessed all necessary strength. The individual grains of which it was composed did not, however, possess sufficient elasticity and cohesive force to yield to the strain and regain their original positions when the strain was removed. Had a tough, impervious and tenacious rock like a diabase been employed, the writer ventures to assert, replacement would not have become necessary in our day and generation, to say the least.

Resistance to abrasive action.—That the power of any stone to resist the abrasive action of wind-blown sand and dust may in certain situations be an item worthy of consideration is not generally realized. The amount of actual wear to which a stone in the walls of a building is exposed from this source is naturally but slight in comparison to that to which stones in walks and sills are subject from the friction of passing feet. Nevertheless, it is sufficient in many instances to become appreciable after the lapse of many years. There is now on exhibition in the National Museum at Washington a plate of glass formerly a window-pane in the light-house at Nantucket Beach, Massachusetts. This was so abraded by wind-blown sand during a storm of not over forty-eight hours' duration as to be no longer transparent and to necessitate its removal. The grinding is as complete over the entire surface as though done by artificial means. This same process is going on, though in a greatly lessened degree, in all our city streets where the wind blows dust and sand sharply against the faces of buildings. The impact of these small particles is not sufficient to perceptibly wear away the fresh stone within a limited time, but it may often be sufficient to crumble away the small particles already loosened by atmospheric action and expose new faces to be acted upon. Professor Egleston states that in many of the church-yards in New York City the effects of this abrasive action can be seen where the tombstones face in the direction of the prevailing winds. In such cases the stones are sometimes worn very nearly smooth, and are quite illegible from this cause alone. Illustrations of the mistake in laying soft and friable sandstones for walks and steps are so numerous I hesitate to touch upon the subject at all. At the present moment the most pronounced case in mind is that offered by the old flight of stone steps (lately removed) leading up to the western entrance of the Capitol building at Washington. These were of a soft sandstone and while they might have answered well for a private building had become worn and hollowed from the daily friction of thousands of footsteps to a very marked degree, the front edge of the tread being in some cases lowered fully an inch below its original level.

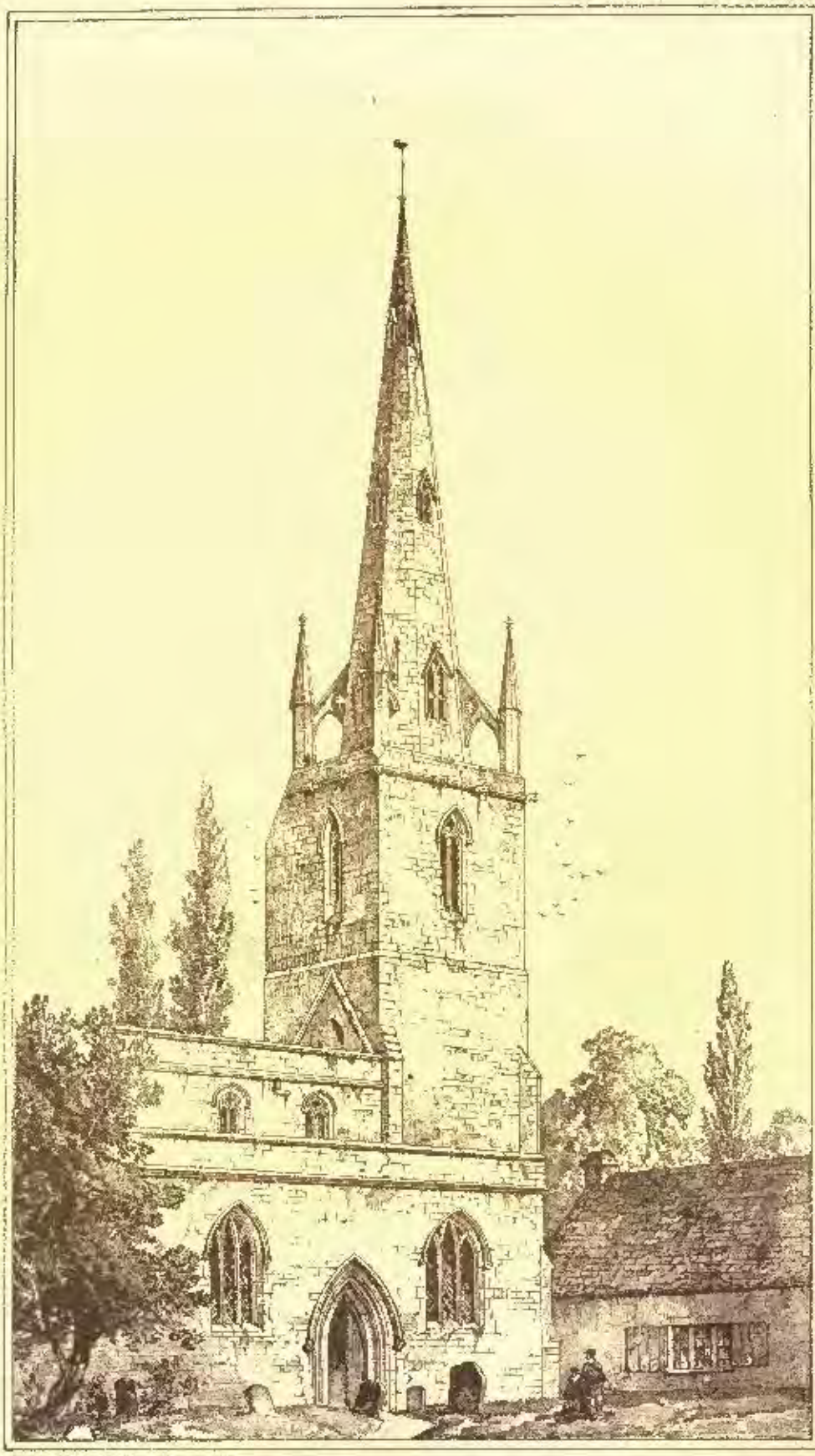
As to the commonly employed methods of testing: as a matter of fact no tests are now systematically made with a view of ascertaining the absorptive properties and resisting powers of any stone to the action of frost, although these are, as I have already noted, the most important qualities. In testing the absorptive powers, the methods adopted by both General Gillmore, at Staten Island, and Professor Winchell, at Minneapolis, were substantially as follows: well-dressed cubes from one to two inches in diameter were thoroughly dried, and after cooling weighed, and then immersed in water for periods of several days. They were then removed, the surface-water removed as quickly as possible with bibulous paper and the specimen again weighed; the increase in weight, of course, representing the weight of the absorbed water. In stating the result the increase was always designated in the form of a fractional part of the entire weight; thus if a cube weighing 300 grains dry weighed 301 when saturated the ratio was expressed as $\frac{1}{300}$. This method when carefully carried out in all its details seems sufficiently accurate. Care needs to be exercised in drying to expel all previously absorbed water; and certain authorities have gone to the trouble of immersing the cubes under a bell-glass and then exhausting the air, to ensure complete saturation. This is an unnecessary refinement of methods since no stone is subject to anything like such conditions either in its natural bed or in the walls of a building.

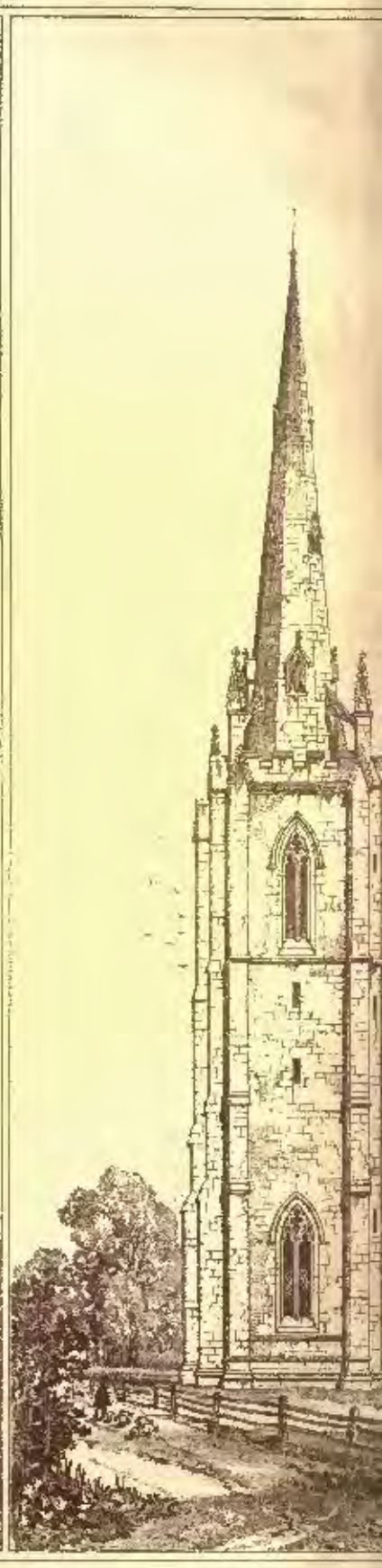
Obviously, the best method for ascertaining the ability of a stone to resist the action of frost is to actually expose the blocks when saturated to freezing temperatures, and then, after several repetitions of the freezing and thawing process, to note by weighing the actual loss by disintegration, or, better yet, the loss in strength. Unfortunately, this cannot at all times and all places be done, and artificial methods must be resorted to. Brard's process, as modified by M. Héricart and Thurg, consisted in boiling the stone to be experimented upon for half-an-hour in a saturated solution of sulphate of soda (glauber salt), and then allowing it to dry, when the salt taken into the pores of the stone crystallized and expanded in a manner supposedly similar to that of water when freezing. This process is now practically given up, as experiment showed that the salt exercised a chemical, as well as mechanical action, giving results somewhat at variance with those of freezing water. Nevertheless, the tests made by Mr. C. G. Page, in 1847, with reference to the selection of stone for the Smithsonian Building at Washington are sufficiently instructive to be noticed here. The samples operated upon, it should be stated, were cut in the form of inch-cubes. Each cube was immersed for half-an-hour in the boiling solution, and then hung up to dry; this performance being repeated daily throughout the four weeks that the experiment lasted. The results obtained were as follows:

	Specific Gravity	Loss in weight, in grains.
Marble, close-grained, Maryland.	2.834	.19
Marble, coarse, "Alum Stone," Md.	2.957	.50
Marble, blue, Md.	2.813	.31
Sandstone, coarse, Portland, Conn.		11.39
Sandstone, fine, Portland, Conn.	2.083	24.03
Sandstone, red, Seneca Creek, Md.	2.672	.70
Sandstone, dove-colored, Seneca Creek, Md.	2.488	1.78
Sandstone, Little Falls, N. J.		1.88
Sandstone, Little Falls, N. J.	2.482	.02
Sandstone, coarse, Nova Scotia.	2.615	2.16
Sandstone, dark, Seneca Aqueduct, Md.		6.60
Sandstone, Aquia Creek, Va.	2.230	18.60
Granite, Port Deposit, Md.	2.609	5.06
Marble, Montgomery Co., Penna.	2.827	.35
Marble, blue, Montgomery Co., Penna.	2.699	.28
Soft brick.	2.213	16.46
Hard brick.	2.294	1.07
Marble (coarse dolomite), Pleasantville, N. Y.	2.86	.01

Results to which I wish to call especial attention are those obtained on the red sandstone from Seneca Creek, Md., and that from Aquia Creek, Va. The first of these, with a specific gravity of 2.672, or a weight per cubic foot of 167 pounds, lost by disintegration but .70 grains. This was the stone ultimately selected for the Smithsonian, and the building as a whole is to-day probably in as good state of preservation as any of its age in the United States. The second stone, with a specific gravity of 2.23, or a weight per cubic foot of but 139.37 pounds, and which lost 18.6 grains, is the one used in the construction of the old portions of the United States Patent Office, Treasury, White-House, and Capitol Buildings. The stone is so poor, and disintegrates so badly, that only repeated applications of paint and putty keep them in anywise presentable. The results obtained with hard and soft brick are even more striking: the one weighing at the rate of 138 pounds per cubic foot losing 16.46 grains, while the harder brick, weighing 143 pounds, lost but 1.07. If anything can be learned from the series, it is that, with substances having the same composition — those which are the most dense, which are the heaviest, bulk for bulk — will prove the most durable. The results obtained on the coarse and fine blocks of Portland sandstone suggest, at least, that water would freeze out of the coarser stone, and, therefore, create less havoc than in that of finer grain, a probability to which I have already referred.

The pressure-tests that have been made in times past have, for purposes of future reference, been deprived of a large share of whatever value they might otherwise have had by the unsystematic manner in which the experiments were carried out. General Gillmore has shown, in his admirable series of experiments upon cubes of varying sizes, that "at least within certain limits, the compressive resistance of cubes per square-inch of surface under pressure increases in the ratio of the cubic roots of the sides of the respective cubes expressed in inches." So far as I can learn, however, these





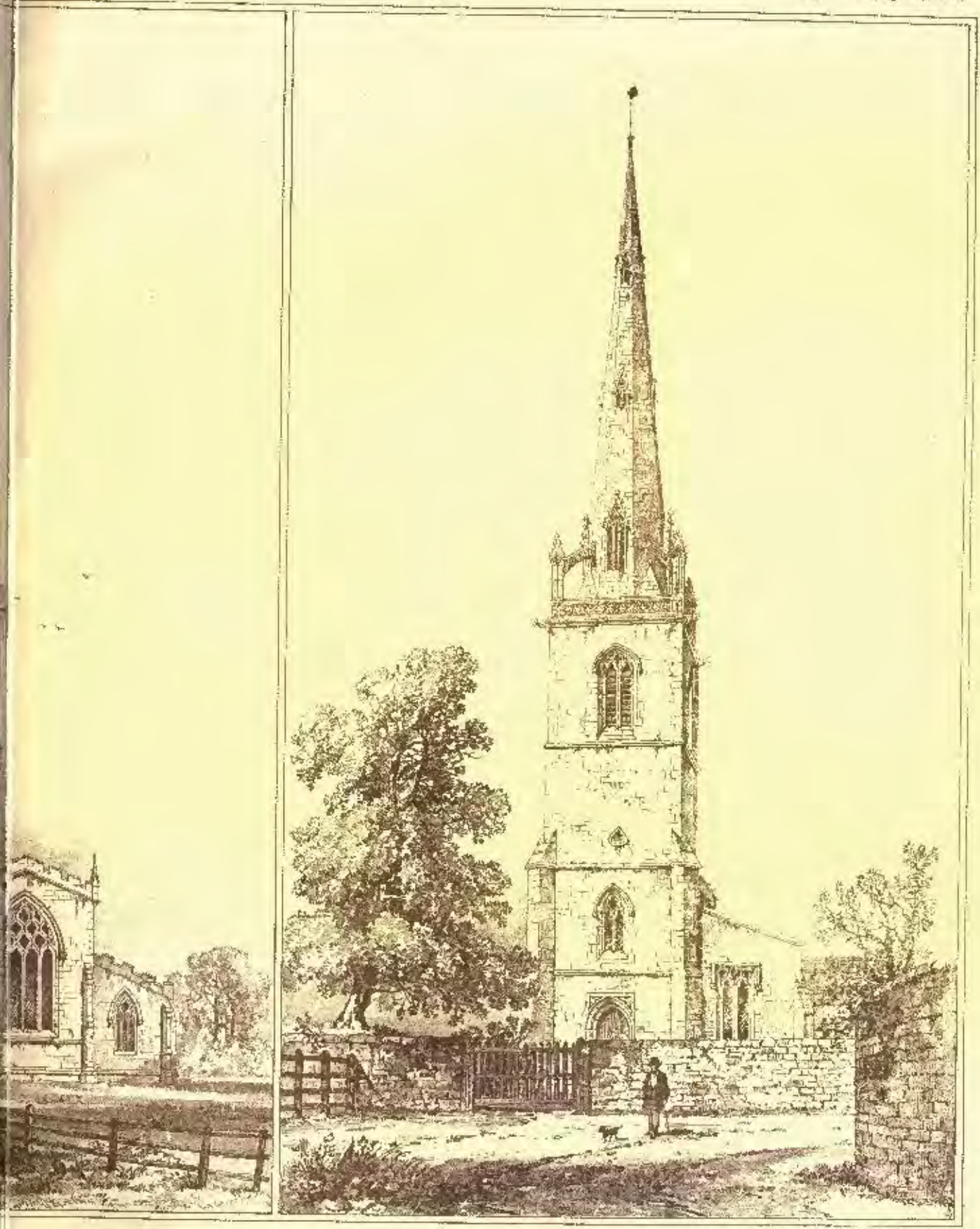
Saint Peter's, Harrold.

Bedfordshire.

Saint Andrew

Norw

Plate N° 40.



Heliotype Printing Co. Boston

Billingborough.

Saints Peter and Paul, Aston Mandit,

Northamptonshire.

results are wholly ignored, each architect or engineer working on an independent basis, testing blocks of such size and shape as are sent him, or are most readily obtained. Gillmore, as above noted, used two-inch cubes. The architect of the Congressional Library Building proposed, I believe, to use one-inch cubes. Tests on stone for the Philadelphia City-hall were made on blocks varying from six to seven inches in diameter; indeed, the size of the block seems in many instances to be limited only by the capabilities of the testing-machine, and, in the report of the last case alluded to, we find record of three blocks that sustained the maximum of load of the machine (800,000 pounds) without perceptible injury. Still another discrepancy lies in the fact that, in advertising for blocks to be tested, no mention is made of the manner in which these blocks are to be prepared. A small cube trimmed out with hammer and chisel from necessity becomes filled with incipient fractures, and such a block may crush under considerably less pressure than a really weaker stone which has been sawed to proper size and retains its natural strength. Still further, the reports of such tests are often wholly invalidated through the ignorance of whoever may be in charge of the exact nature of the material experimented upon. All finely fragmental siliceous rocks, whether composed wholly of grains of quartz, or quartz, feldspar and mica, whether with siliceous, ferruginous, or calcareous cements, are classed together as sandstone, with no further description than a reference to color. All crystalline siliceous rocks, including granite, gneiss, mica-schist, and even trappean rocks, like the diabases, norites, diorites, and kersantites, are considered as granites. All calcareous rocks, whether magnesian or otherwise, are, if of good color, marbles; or, if of poor color, and finely compact or amorphous, merely limestones. It is obvious that such a classification is not sufficiently precise to be of value.

I think there can be no doubt but I have shown that, as first stated, the problem is a difficult one, and also that the few efforts made toward its solution are of little value, except as showing what methods are to be avoided in the future. It remains to be seen if anything better can be suggested. I will briefly outline a scheme such as has been gradually shaping itself in my mind for several years past. The subject has been very forcibly impressed upon me in connection with my duties as curator in the National Museum, and more particularly when preparing for exhibition the extensive building-stone collection made by the Tenth Census, a partial duplicate of which was also prepared under my direction for the American Museum in New York City.

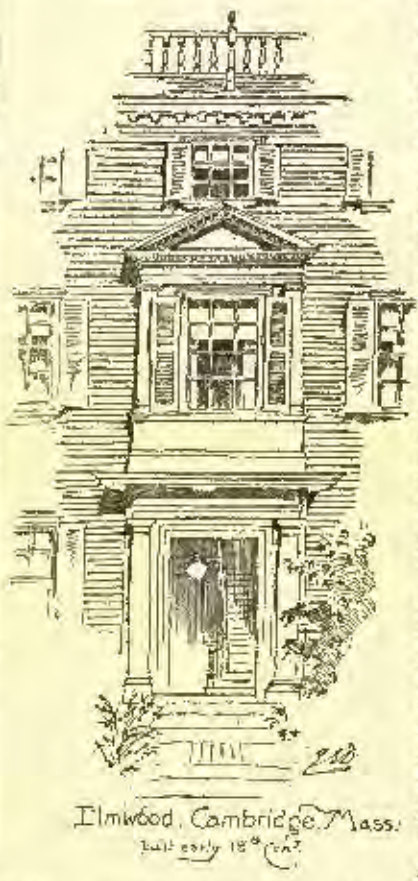
Assume, first, that the stone to be examined is designed for use in the exterior walls of a building, subjected to all the vicissitudes of our Northern climate, and to only such conditions of pressure and strain as exist in any of our government buildings.

All things considered, it seems best that the experiments be conducted on two-inch cubes. These should be prepared by sawing and grinding, never by hammer and chisel. After drying at a temperature not exceeding that of boiling water, the ratio of absorption should be determined by complete immersion for a period of not less than forty-eight hours; the method, as followed by General Gillmore, is sufficiently accurate. The cubes should then be repeatedly frozen and thawed while in a saturated condition, and the amount of disintegration ascertained by careful weighings. If the stone is a fragmental one (sandstone), and it is found to suffer appreciable disintegration by freezing, it may be well to ascertain the loss in strength as well. This can be done by crushing the cubes after freezing, and while still saturated, and also freshly-prepared cubes not otherwise tested. The freezing can be brought about artificially by means of such apparatus as is used in making artificial ice.

The question of durability of color and resistance to atmospheric action can be settled only by chemical and microscopic tests. The condition of the iron, whether in the form of sulphide, carbonate or protoxide, is the main question to be considered. A little can, perhaps, be learned by submitting samples to the action of artificial atmospheres, samples being suspended for several weeks under bell-glasses charged with acid fumes. The resistance to the effects of carbonic acid can, perhaps, be best determined as Professor Winchell has done, by placing the samples in a basin of water through which carbonic-acid gas is kept bubbling. This test is scarcely necessary, except upon calcareous rocks or fragmental rocks with calcareous or ferruginous cements. The determination of the modulus of elasticity as made by processes now in vogue is apparently sufficiently accurate. When, as may sometimes happen, it is desired to ascertain the relative powers of resistance to wear, as in pavements, or from wind-blown sand, this can readily be done by means of a carefully-regulated sand-blast, such as is used in the Tighlman process of stone-carving. This property might almost equally well be learned, however, by observing the manner in which the stone worked under the chisel.

A very essential item in this connection is that the tests be conducted under the direct supervision of one thoroughly acquainted with the mineral and chemical composition of rocks, their structure, origin, mode of occurrence, and characteristic manner of weathering. A purely theoretical knowledge is valueless, and only one who has devoted years of time to the work, both in the laboratory and in the field, can hope to deal with the matter successfully. One great difficulty with all such work is that we are prone to expect too much, to obtain immediately results which, in the ordinary course of events, can be brought about only by months, and perhaps years, of careful observation, study and experiment.

THE METROPOLITAN MUSEUM OF ART.



THE reopening of the Metropolitan Museum in December was an event of decided interest in the art-world. The new wing having doubled the space at its command, the Museum was able to make an imposing show of its valuable belongings, supplemented by some important loans.

The casts of Assyrian and Greek sculpture which decorate the fine hall into which the main entrance conducts the visitor are a welcome acquisition, though as yet not sufficient in number to form a representative collection. The munificence of Mr. Henry G. Marquand, one of the Trustees, has, however, provided means for the completion of this department, and casts of the most important sculptures in European museums have been purchased, and will be displayed as soon as space can be found for them. The collections of Phœnician, Greek, Roman, Venetian, and Florentine glass, also given by Mr. Marquand, together with that presented by the late James Jackson Jarves, and the ancient glass from the Cesnola collection, are now placed in one room, and form a most important group, said to be equal to any in the world. Be this as it may, there is here a wealth of beauty in form and color which is inexhaustible. In the same hall is a fine lot of rare and beautiful old laces from Europe and the East, given by the late Mrs. John Jacob Astor and Mrs. R. L. Stuart, and costing many thousands of dollars. They are placed, with the MacCallum collection of laces, in swinging frames on iron standards. The Museum has lately received a valuable collection of Egyptian antiquities, including many sarcophagi and mummies, with numerous smaller objects, found by Maspéro in 1886. These, or a number of them, are of persons of high rank and their burial-cases are richly decorated, the colors on some being as bright and fresh as if laid on yesterday. The mummies and their double cases have been most ingeniously and advantageously arranged, separately and in different positions, so that (aided sometimes by mirrors) one can see not only all around and underneath, but inside the cases. As these interiors are often also highly ornamented, this is a distinct aid to examining them. Near these splendid and curious coffins, in some of which fair and noble ladies — princesses, perhaps — have lain embalmed for tens of centuries, are frames filled with embroideries and textile fabrics found in the Fayûm, dating from the second to the eleventh centuries of our era, many of them elaborately patterned, and with colors still in excellent preservation. The Ward collection of Assyrian and Babylonian antiquities, such as clay-tablets, seals, cylinders, inscribed clay barrels, gold and other ornaments and bronzes, has also been acquired and is now on exhibition. An alcove of the lower hall is devoted to wrought-iron and other metal-work, and there are a number of antique musical instruments, a huge, finely-carved clock of English work, dated 1640, two large cabinets, one inlaid with Oriental porcelain and various pieces of carved wood, including some fine specimens of Frullini's work. The great main hall of the older portion of the building is to be devoted to the Willard collection of architectural casts, and a large inscription to this effect has been put up. A number of them have arrived, and are stored in the Museum, and it is hoped that they will be placed in position during this winter. In the meantime the floor-space of this hall is vacant, but on the faces of the north and south galleries have been placed casts from the frieze of the Parthenon, and at one end are hung some old tapestries, opposite which Makart's enormous picture of "Diana's Hunt," a lately acquired gift, lends its rosy flesh-tints and sumptuous color to the spacious hall.

The Huntington gallery of memorials of Washington, Franklin, and Lafayette is an interesting place, where are arranged representations and all kinds of souvenirs of these distinguished patriots. The paintings, busts, statuettes, medallions, pottery, prints, medals, autographs, and many other objects here displayed serve to recall their deeds and vivify their memories. The Lambert collection of American antiquities is composed of antique and comparatively

modern idols and fetishes worshipped by the aborigines of New Mexico, and objects from Mexico, Central America, Peru, and elsewhere. Another room is devoted to gems and objects in precious metals, and contains the Johnston-King collection of ancient gems; the Curium treasures from the Cesnola collection; the Lazarus collection of miniatures; cases of coins, watches, snuff-boxes, and silverware; and the Maxwell Summerville collection of engraved gems, pastes, cameos and rings. This is an exceedingly valuable and beautiful gathering, and, by the kindness of the owner, will remain on loan with the Museum for several years. Around the walls of this — the "Gold" room — are hung some magnificent Persian rugs, old tapestries, and pieces of Spanish and Venetian leather, French embroidered silks and Genoese velvets, loaned by Mr. Marquand. The Vanderbilt collection of drawings by the old masters, with a large number of similar sketches and studies given in 1887 by the artist Cephas G. Thompson (since deceased) has been hung in a long gallery on the second floor, with several frames of etchings by Haden, Whistler, Jaeque and others, given by W. L. Andrews. An alcove leading from the gallery holds the Hidden collection of civil and military decorations and orders, and here, also, have been hung the water-colors by William T. Richards.

The most popular of the many good things shown seems to be, as usual, the modern paintings, two galleries being filled with the pictures given by Miss Wolfe; two with the other modern works, including such well-advertised canvases as Rosa Bonheur's "Horse Fair," Meissonier's "1807," Detaille's "Defence of Champigny" and Piloty's "Thusnelda," which are the property of the Museum; and one with its old masters, including the large and important example of Sir Joshua Reynolds — "The Hon. Henry Fane and his Guardians" — given by Mr. Junius S. Morgan. Then there is a gallery full of loaned modern paintings, and another — the Mecca of many a pilgrim of art — holding a splendid collection of old masters, the like of which was never seen in this country before, and which was given to the Museum, since its reopening, by Mr. Marquand. This makes seven galleries of pictures in all, and, in round numbers, five hundred paintings. Mr. Marquand has generously despoiled his beautiful house of its choicest paintings and sent them here. This gentleman, and his name should be dear to all true art-lovers, is one of the very few American collectors — Mr. Quincy A. Shaw, of Boston, is another — who cares to gather any pictures but modern ones. He acts in the spirit of those words from one of the discourses of Sir Joshua Reynolds, which are inscribed on the walls of England's National Gallery: "The works of those who have stood the test of ages have a claim to that respect and veneration to which no modern can pretend."

It is an ungracious thing to criticise gifts, but if part of the large sums spent upon some of the pictures of the day (and of the day only) which have been presented to the Metropolitan Museum, had been used to buy good, not necessarily "important," examples of the work of the great artists of former centuries, it would be much better for everybody. The chief glory of the Marquand paintings is the portrait of James Stuart, Duke of Richmond and Lennox, by Van Dyck, which hangs at one end of the gallery. It is a life-size, full-length representation of a pleasant-faced young cavalier, with long, curling, yellow hair, who wears a black dress with white silk stockings, and stands easily before us, one hand resting on the head of a fine greyhound which looks up into its master's face. Van Dyck painted half-a-dozen portraits of this nobleman, one (a half-length) being now in the Louvre, and introduced the dog in two or three of them. The story is that the youthful Duke when travelling on the Continent was preserved from assassination by this dog, which slept in his chamber and aroused him from his sleep. James Stuart was a favorite courtier and faithful adherent of Charles I, whose father and his were cousins, and received many favors from the King, which he well repaid. He was hereditary Lord Chamberlain and High Admiral of Scotland, was made a member of Charles's Privy Council when scarcely twenty-one, and appointed Lord Steward of the royal household and Warden of the Cinque Ports. He loaned Charles large sums of money to help his failing cause, and his two younger brothers both entered the royalist army and were slain. He lived a few years after the death of the King, at whose execution he was present (it is told that he offered to suffer death in his cousin's place), and was allowed the privilege of burying him. After this, he retired into absolute privacy and died, it is said, of the gradual effects of grief, in 1655, being then only forty-three years of age. This portrait formerly belonged to Lord Methuen, in whose collection at Corsham Court, it was seen and described by Dr. Waagen over thirty years ago, and has been engraved by Earlom. It displays all the dignity, ease and refinement which are associated with Van Dyck's courtly sitters, and is a superb example of his powers as a portrait-painter. Some one has truly said that we cannot judge how much of the romantic interest and sympathy with which the subsequent generations have regarded the cause of the Stuarts is owing to the pictures of them and their supporters by Van Dyck. The beautiful hound in this portrait is painted as carefully as his master, his affection towards whom being admirably represented. An excellent portrait of a lady is also by Van Dyck, and by Rubens there is an early work, "Pyramus and Thisbe," and a good portrait of a man. Of the Flemish school, also, we find a small and minutely finished "Virgin and Child," attributed to Jan Van Eyck.

There is a masterly little portrait of the child Don Balthasar, by Velasquez, and a larger one of the Doña Maria Anna, a solid-looking young woman, with an enormous head-dress; and one other Spanish picture, a "St. Michael and the Devil," warm and bright in color, by Zurbaran. Of the English school, there is a charming portrait of Lady Carew, tender and sweet, by Sir Joshua Reynolds; a fine "Young Girl with Cat," by Gainsborough; and a warm golden-brown picture by Turner, showing the little port of "Saltash." This was painted about 1812, and Mr. Ruskin praises it as an example of perfect truth in the painting of water. Then we come to two large landscapes by Constable, "The Valley Farm" and "The Lock," both subjects which the artist has made familiar by other renderings of them; a good landscape by "Old" Crome, and a beautiful small shore view by Bonington. Only one French artist is represented — Prud'hon, by a sketch for his large painting of the "Assumption" in the Louvre. This once belonged to William M. Hunt. Masaccio is the single Italian present, to him being ascribed a "Female Head," with a man in a curious red hat, looking through a window, the whole in the delightfully quaint early Florentine style of portraiture. The Dutch school is shown in portraits, not one of which is without its good qualities, and some being excellent, by Juriaen Ovens; Hoogstraten (a man and woman on the same canvas); Franz Hals (two pictures), Janssen and Terburg; in landscape, by Ruysdael and Teniers; and in *genre* by Teniers, with two copies from Bassano, Netscher, Zorg, and an exquisite small painting of a "Young Women opening a Casement," by that rare and little-known master, Van der Meer of Delft. This is one of the gems of the gallery, and it would be an incredible monster of a collector who could have congratulated Mr. Marquand upon owing it without envying him.

An "Adoration of the Shepherds," the authorship of which is given to Rembrandt, hangs near the grave head of a man in a black hat, from Lord Lansdowne's collection, by the same great artist, two of whose best portraits are also here. These are the portraits of Van Beresteyn, burgomaster of Leyden, and his wife, which Mr. Henry O. Havemeyer lends to the Museum. Discovered a few years ago at a sale of the old portraits belonging to the Beresteyn family, in Holland, they were afterwards brought over by Messrs. Cottier & Company, who sold them to Mr. Havemeyer. They are magnificent examples of the great Dutch portrait-painter, and are in admirable condition, dated 1632, which, with the master's signature, is plainly to be seen on each. The figures are of two-thirds length, life-size. These plain, shrewd, honest people, this man who has doubtless made a substantial competency in his business, and his careful spouse who has helped him to economize it, stand before us made alive again by the marvellous brush of Rembrandt.

Van Dyck's patrician at the other end of the room and Rembrandt's bourgeois at this, are the select ones of this goodly company of pictures. It is perhaps worth noting how nearly alike, and how few and sober are the hues which the painters have used on these portraits. Black, white and yellow — but what rich harmonies of color are the result.

The list of old masters is closed by a "Christ before Pilate" (in distemper) and an "Ecce Homo," both attributed to Lucas Van Leyden, and an interesting portrait by a master common to all the schools, who has produced innumerable pictures of all kinds — good, bad and indifferent. His name is "Unknown," and this time he is Dutch. All these paintings, save the two Beresteyn portraits, have been presented by Mr. Marquand. Several of them, besides the Van Dyck, are from the Methuen collection.

The loaned modern pictures, most of which are lent by that well-known collector, Mr. George I. Seney, comprise Stewart's "Hunt Ball"; Laurens's "Repudiation of Bertha, wife of Robert the Pious"; Delacroix's magnificent sketch for his "Expulsion from Eden" (belonging to Mr. Havemeyer); Isabey's "Blessing the Hounds," an important Leys; Gérôme's "First Kiss of the Sun" (on the Pyramids); two examples of Cazin; Boughton's "Tam O'Shanter," and many more.

From this review it will be seen how many varied attractions New York's Museum now possesses, and it is to be hoped that others, among her many rich men, may add their contributions to those so generously made by some of their fellow-citizens.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE ARION CLUB-HOUSE, PARK AVE. AND 59TH ST., NEW YORK, N. Y. MESSRS. DE LEMOS & CORDES, ARCHITECTS, NEW YORK, N. Y.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATES 39 AND 40. — ST. MARY MAGDALENE, CHEWTON-MENDIP; ST. PETER'S, HAROLD; ST. ANDREW'S, BILLINGBOROUGH; SS. PETER AND PAUL, EASTON-MAUDIT, ENGLAND.

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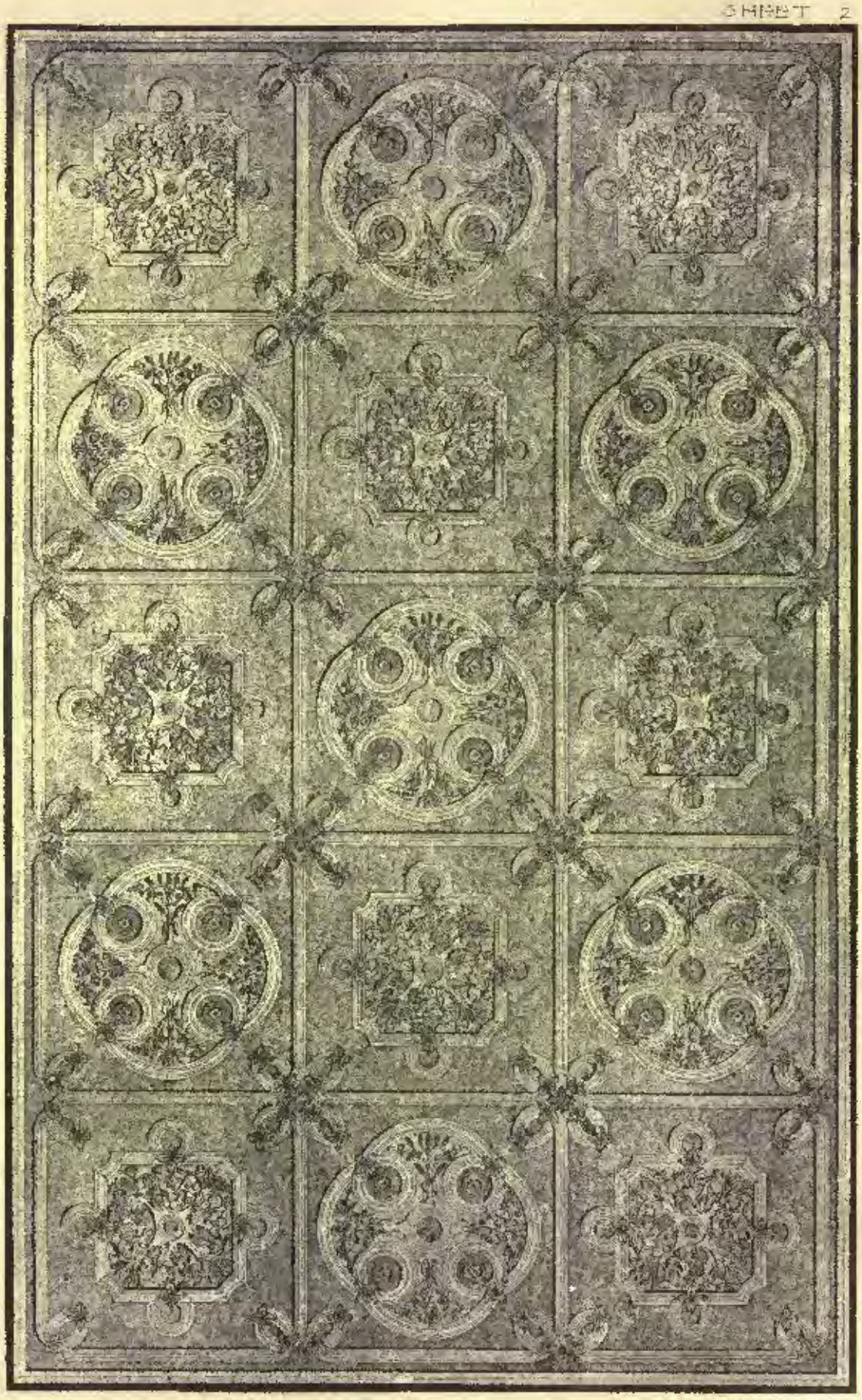
SHEET 2



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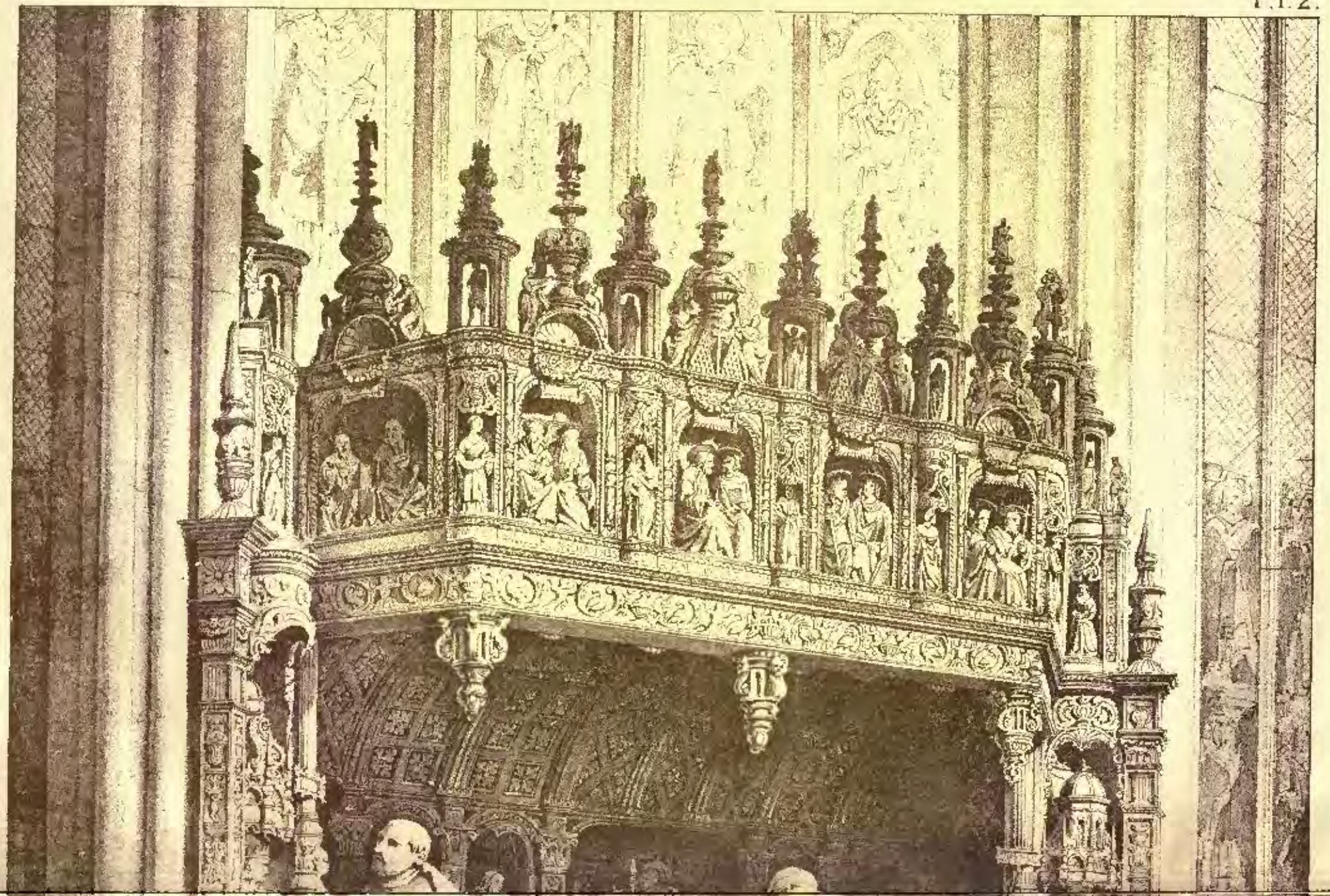
DESIGN FOR PLASTER CEILING

Pl. 2.



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SKETCHES · OF · THE · AGE · OF · FRANCIS · FIRST ·

TOMB OF THE CARDINAL D'AMBOISE,

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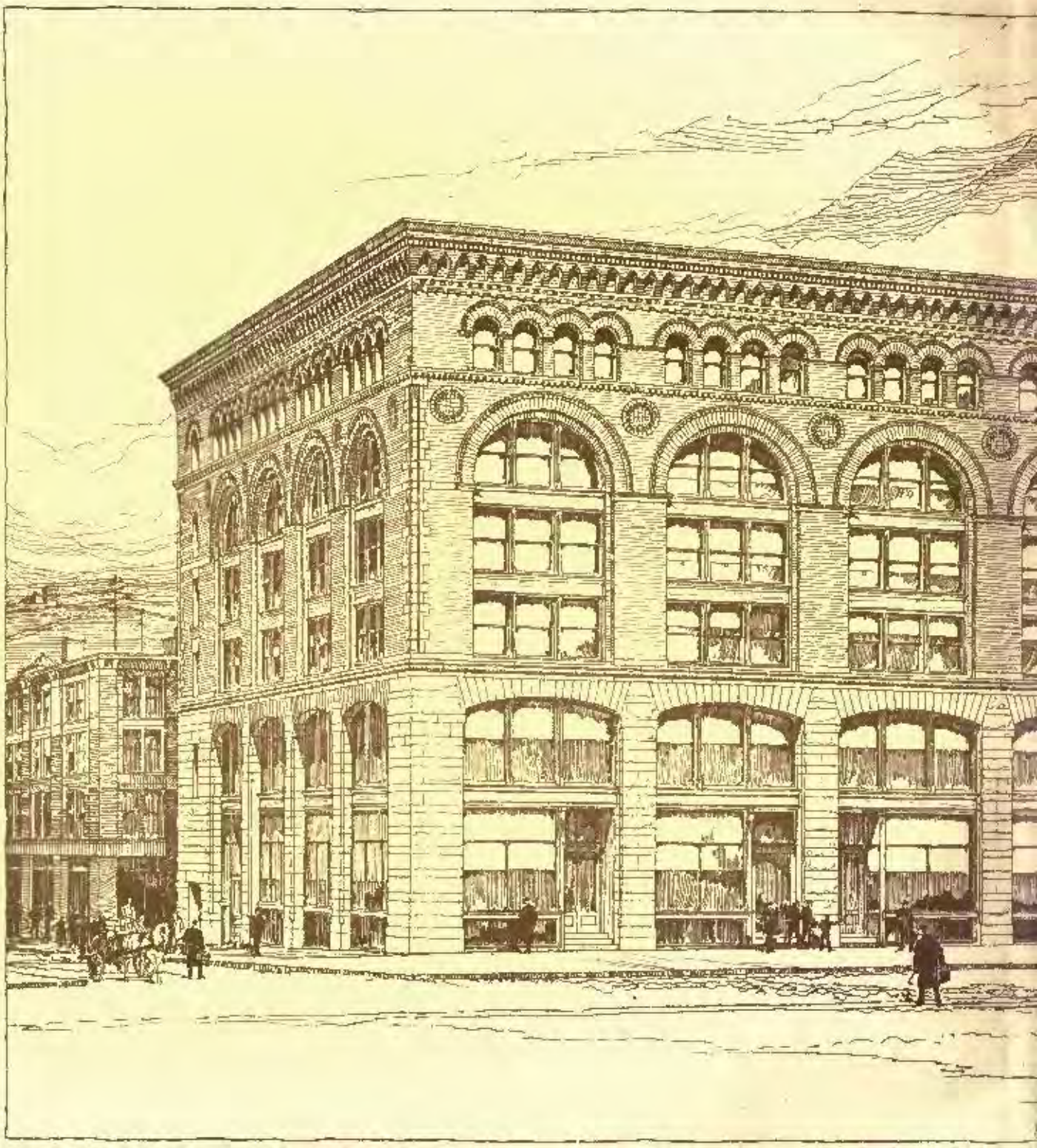

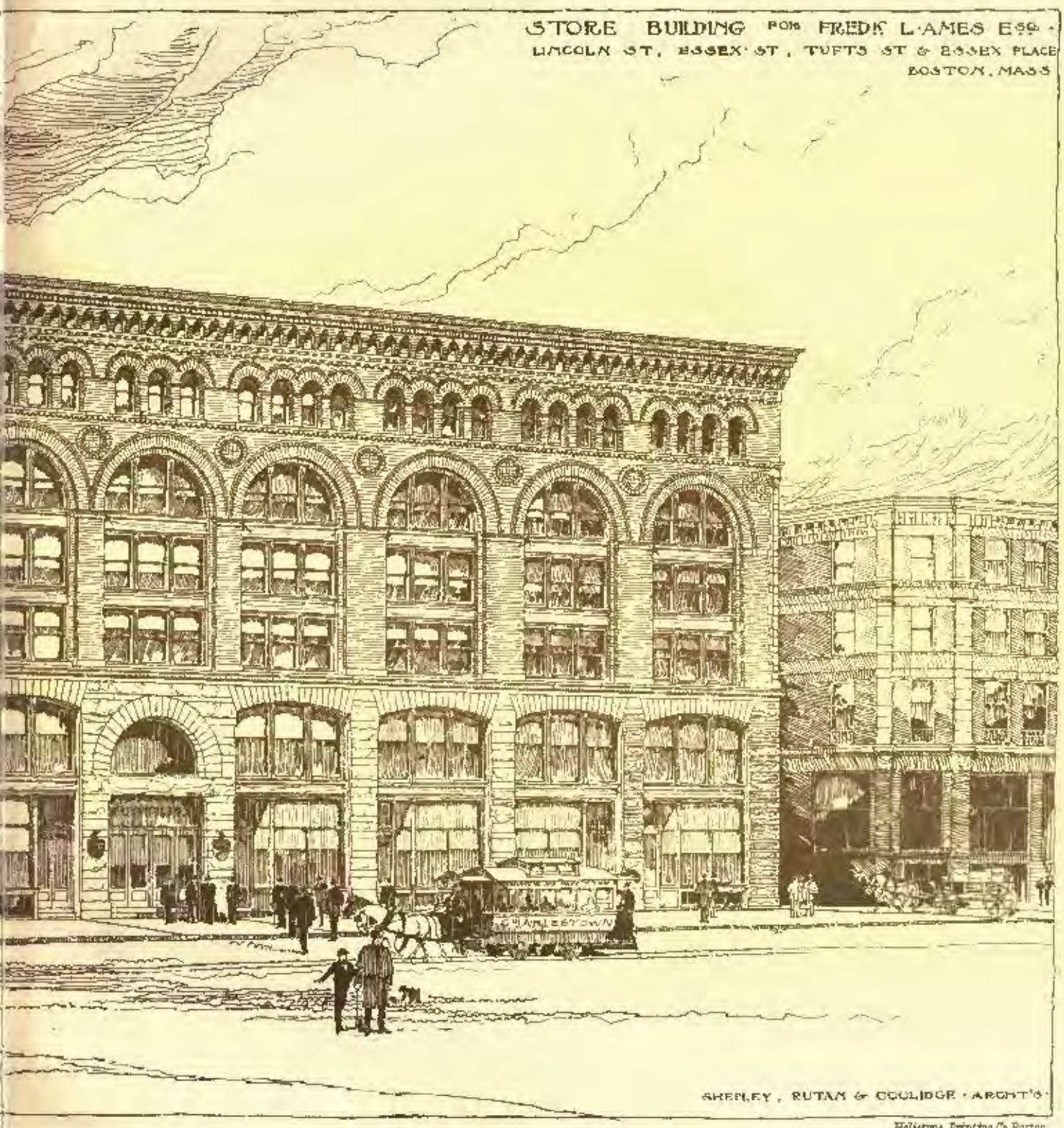

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SHEET 1

DESIGN FOR PLASTER CEILING

THE AGE OF FRANCIS I. PLATE 2.—THE TOMB OF THE CARDINAL D'AMBOISE IN THE CATHEDRAL, ROUEN, FRANCE.

[Issued only with the Imperial Edition.]

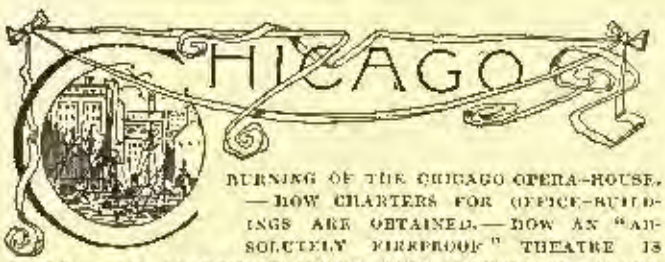
CHURCH OF ST. GILES, LURAY, VA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

THE walls are to be built of native limestone, face-work on both inside and outside, and roof supports of undressed timbers so far as possible; and it is the intention to finish the whole interior in as simple a manner as possible consistent with churchly effect. The cost of this chapel will be about five thousand dollars, and it is intended to be erected on the grounds of the Luray Inn, principally for use in the summer by guests thereof.

WAREHOUSE FOR F. L. AMES, ESQ., LINCOLN STREET, BOSTON, MASS. MESSRS. SURPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

"THE TALLEYRAND," BAR HARBOR, ME. MR. DE GRASSE FOX, ARCHITECT, PHILADELPHIA, PA.

DESIGN FOR A PLASTER CEILING BY MR. C. J. BROOKE, PHILADELPHIA, PA.



BURNING OF THE CHICAGO OPERA-HOUSE. — HOW CHARTERS FOR OFFICE-BUILDINGS ARE OBTAINED. — HOW AN "ABSOLUTELY FIREPROOF" THEATRE IS BUILT. — AN APARTMENT-HOUSE FIRE. — PROPOSED ARCHITECTURAL INSTRUCTION AT THE ART INSTITUTE. — THE OUTLOOK. — MR. EHRICH'S COLLECTION OF DUTCH AND FLEMISH PICTURES. — THE VERESTCHAGIN PAINTINGS. — SUNDAY OPENING AT THE ART INSTITUTE. — LIBBY PRISON.

AMONG the numerous blazes that are constantly occurring, Chicago has, within the last few months, been the victim of two, which, with a slight change of hour or circumstance, might have been catastrophies. The first occurred in the early part of December at the Chicago Opera-house. The performance here had scarcely been finished fifteen minutes, and the actors were still in the building, when an alarm of fire was given, and although this establishment is advertised and described on every programme and poster as being "the only absolutely fireproof theatre in the city," still in less than an hour all the auditorium was a complete wreck either by fire or water. This opera-house is not a building by itself, but occupies the lower stories of the court of a large office-building. The reason for such a location is that the laws of the State of Illinois are such that a charter to build an office-building pure and simple, cannot be obtained. As a result all sorts of expedients are resorted to, in order to obtain charters for those syndicates that desire to build such buildings, and probably the large majority of them are incorporated as safety-deposit companies, although the safe-vault, if it exists at all, consists of a closet in which is stored a trunk containing a watch or two. Owing to this law a syndicate was formed to build an opera-house, although the opera-house itself was but a small part of the plan since the building is ten-stories high, while the theatre, as mentioned above, only occupies the space in a few lower stories that above becomes the court, from which many offices obtain their light. The office-building is undoubtedly fireproof, and possibly it was originally intended that the theatre should be so also, but it certainly did not prove such when the fire broke out. This fire, which started in an upper gallery, was apparently due to some defect in the electric-light plant, but the exact how and why does not seem to be really known, although numerous positive theories are not wanting. But, as is usual in theatre fires, in an incredibly short time the building was filled with smoke. Actors fled leaving their wardrobes a prey to the flames or the deluge of the fire-department. The inaccessibility of the building obliged the firemen to work slowly, but the amount of damage caused by the flames was small in comparison with that caused by the water, since every nook and corner was soaked. Although the money-loss was considerable, the work of repairs was at once commenced, and the theatre was again in full blast within three weeks. It is noticeable, however, that the legend "absolutely fireproof" has now been changed to "fireproof"; but it would seem to be extremely questionable if even such an announcement should be permitted by the authorities, since, in the ordinarily received sense, the theatre is evidently not fireproof, and such an advertisement is only calculated to deceive the people, and in case of another accident might lead to more disastrous results than if the actual truth were not concealed, and each one was on his guard against a panic. Had this fire occurred only a few minutes earlier the casualties must have been numerous, and the whole city congratulates itself on the fact that such a disaster did not take place. Upon examination by architects it was found that this so-called and much advertised "absolutely fireproof" theatre had an attic which, with the exception of a few girders, was entirely of wood, just the same as the cheapest theatre in the city. Moreover, the gallery was practically a wooden construction, owing to the fact that from the original gallery built on iron framework a sight of the stage was absolutely impossible from many parts, and in order to remedy this a wooden construction was built on top of the old gallery until the desired sight-lines were secured; all of which seems to have resulted in something very inflammable. The repairs, so far as known to your correspondent, seem to have been of about the same character as the old construction; but still the building is advertised as "fireproof."

The second escape that we have had from a calamity was a fire in one of the highest, largest, and finest apartment-houses on the North Side. The building, seven stories high, constructed especially with a view to please the eye, with a stone front, elaborate entrance, marble wainscoting, natural-wood finish and hard-wood floors in the apartments, but otherwise of a rather flimsy construction, caught fire in the attic one morning about seven o'clock. Many of the occupants were still abed: they hastened to arise, however, and several of them went forth in garments scarcely adapted to a cool winter's morning. The fire had made considerable progress when first discovered, and this attic, being occupied as store-rooms by the occupants of the flats below, was filled with much that was light and inflammable, so that it burned right merrily. Although the fire-engines were promptly on the ground, the height was so great that even "siamesing" a stream from two engines had little effect, and it was necessarily some time, comparatively speaking, before the proper long ladders, hose, etc., could be arranged to work at such a great height. By this time the fire had worked down, so that the upper story was smoking vigorously, but, when the streams once got to work, the deluge was such that the fire soon succumbed, but the drenching with dirty water that the apartments below received as the liquid gradually filtered through from one floor to another was something appalling. One person was injured by jumping from a window, but otherwise there were no casualties. Had the fire occurred lower down, so that it could have taken advantage of the elevator-shafts and worked both up and down, there would in all probability have been one less "elegant apartment-building" in the city; while, had the stairways been cut off, as probably would have been the case, the loss of life in such a high building might have been very serious.

The subject of an architectural school, or, at least, some kind of an extended course in architectural drawing at the Art Institute, is receiving considerable attention in the daily papers, and eventually something may come of it, although at present it does not seem probable that any very definite action will be taken for some considerable length of time. This agitation has been brought about principally by the generous action of Mr. Robert Clark, who has given the Chicago Architectural Sketch Club the sum of one thousand dollars, the interest of which is each year to be devoted to medals for the best work, and he has stated that he will give considerably more if a school is started. Several other gentlemen have intimated a willingness to imitate Mr. Clark's example, so that when the matter is brought to a head, funds will probably not be lacking.

The outlook for building the coming season, if one may now judge by what architects say, is that there will be fully as many pieces of work as last year, but the number of extremely heavy and large constructions, especially office-buildings, appears to be somewhat limited: there will, however, be several important buildings of a semi-public character, such as libraries, that will undoubtedly be commenced during the next twelve months, while an unusually large number of fine residences are already on the boards.

During the past few months Chicago has been favored, as never before, with art displays in all directions and of all kinds and it is extremely remarkable to note the extraordinary growth of popular interest during the past year alone, in all art questions. We are getting so fully satisfied with our own appreciation of art, and this artistic spirit is so rapidly growing and developing in every one that it seems a perfect matter of course that the Verestchagin collection should come here direct from New York before being exhibited at the other Eastern cities.

The first important display of the season was a collection of old Dutch and Flemish paintings belonging to Mr. Louis Ehrich. This exhibit contains some two hundred paintings, and although there are few canvases by the great masters, still it contains many extremely good things of this period and gives as perfect an idea of the art of Holland and Flanders as many of the smaller museums of Europe, and as an exhibit of these schools, which had never before been at all fully exhibited here, it attracted great attention. Especially on the free days the rooms were crowded.

The Dutch pictures were followed by a small collection of the old Italian masters, which in their turn were much admired and now they have given place to the most remarkable exhibition ever yet shown to the Chicago public at the Art Institute, in the collection of the famous Russian, Verestchagin. This was opened to the public on February 1, and has ever since been thronged.

To the disappointment of many the artist, himself, does not come to Chicago, still the pictures were hung by his regular assistants who have literally taken possession of the Institute. The noble Greek and Roman gentleman (in plaster) have been unceremoniously hustled off into back rooms to allow for the proper display of this collection, while the few casts that could not be moved have been covered with drapery until entirely concealed. The manner of arranging the

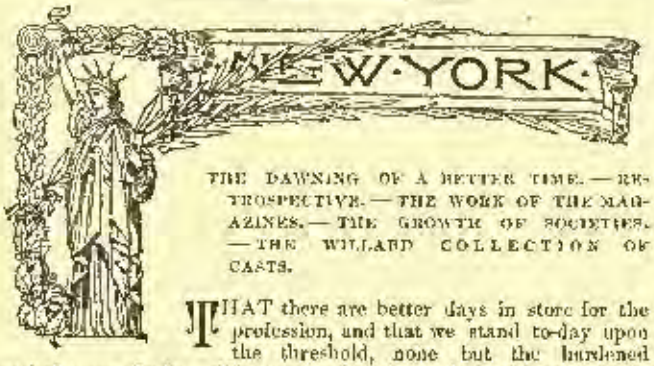
exhibit savors possibly a little of the panorama with its little tricks of effect, but the result is so very satisfactory as scarcely to make one wish that it were otherwise. The huge rugs, duplicated for the artist from those now in temples in India, are draped upon all sides with bits of Oriental armor, so that the servants in Russian costume, and the tea served from a samovar does not possibly seem entirely out of place with the surroundings.

If Verestchagin excelled in no other department he certainly would always be marvellous as a painter of architectural subjects and his views of the Taj, and some of the mosques of India together with his scenes of the Kremlin, at Moscow, are wonderful revelations of the beauty of those monuments. At the same time that this collection is before the public at the Art Institute, the Chicago Artists' Club is giving an exhibition of the work of its members during the past year, and the result is certainly a credit to those painters who have their studios in Chicago.

Besides these various displays, there have also been in the course of the winter several fine exhibits in the salesroom galleries, any of which would have been considered a treat a few years ago. Then, not only are the painters busy but the sculptors' studios all seem unusually full of work of a high order of merit, and bronze statues and bas-reliefs are now being cast here for some of the most important sculptural work in the West.

As mentioned some time since in one of these letters, it was decided to try the plan of having Sunday opening of the collections of the Institute. This has now been in operation for nearly three months, and the results have been most satisfactory, and in some respects surprisingly so, for the experiment has been tried of exhibiting without any railing or signs of "hands off," and up to the present the authorities have had no cause to regret this step. In one point, however, there is possibly a little disappointment: it was hoped that the poorer working-classes would especially take advantage of the day and the fact that no admission-fee was charged. Such, however, does not appear to have been the case, for the crowd consists mainly of the rather well-to-do class, who possibly cannot, but certainly *think* they cannot get away from business upon a week-day, so that the visitors are generally well-dressed and well-behaved.

For some time a number of Chicago capitalists have been negotiating with parties at Richmond, Va., for the purchase of the old and historic Libby Prison, and the business has now been closed. The building will at once be taken down in sections, each carefully numbered and shipped to Chicago, where it is to be re-erected and used as a war-museum. Whether it will be a financial success or not, architects will be decidedly interested to watch the construction as it proceeds, for, of all the various building operations at Chicago, this will assuredly be the most remarkable one during the coming six months.



THE DAWNING OF A BETTER TIME. — RETROSPECTIVE. — THE WORK OF THE MAGAZINES. — THE GROWTH OF SOCIETIES. — THE WILLARD COLLECTION OF CASTS.

THAT there are better days in store for the profession, and that we stand to-day upon the threshold, none but the hardened pessimist can doubt. The tendencies shown in architectural discussions both public and private, the positions taken by the daily papers and by the more intelligent laymen regarding our work and our position, all confirm the progress made within the last dozen years and are assuredly full of promise for the future.

The great trouble in our past history has been such as is inevitably associated with the growth and development of any new and far-reaching factor in our already complex civilization, and the peculiar position of the architect making him both artist and engineer, both judge and advocate, has helped to retard our progress towards assured recognition. The architect of but a short generation ago had to justify his very right to exist, and his clients came to him, if they came at all, with an uneasy consciousness that they were indulging in an extravagance: deep down in their minds lurked analogies, drawn perhaps from political campaign literature, anent republican simplicity and the effete despotisms of Europe. The architect seemed to them in someway associated with riotous living, with the Baron Haussman and the Third Empire. This attitude on the part of the client was fostered and prolonged, indeed it still lives to a degree, by a variety of influences actively working within the profession itself. The first American architects, to except the very few notable but isolated instances in our earliest history, began their careers well within the memory of men now living and practising; before their time, architect and master-builder were practically synonymous terms and had identical functions. The only training then attainable was to be had only in Paris or in London, and with the influences of that training and, perhaps, some European travels fresh upon him our architect was thrown upon a community more self-centred, more intent upon the immediate dollar and less open to the softening influences of the artistic amenities of life than any society of equal worth ever known. They were obliged to battle for recognition almost alone, mistrusted by their nominal associates the master-builders, distrusted by the public and stigmatized as mere theorists. In spite of all they triumphed, and not the least of their achievements was the training of scores of devoted and enthusiastic younger men, inspiring them with their own love for their chosen profession, and instilling into them by precept and example the determination to do the best that was in them to do.

But both master and pupil felt the influences of environment, and, of necessity, emulated the reed rather than the oak in their relations with the public. Under the necessity of compromising with their ideals (let us hope not with their consciences) in order to meet the demands of their clients, who did not understand their position and grudgingly admitted their utility, the architects had to throw over the traditions learned abroad, or growing up out of the building trades had no traditions of professional life, and thus lacking a clearly expressed and definite purpose all their attempts at united action were at first feeble, halting and inefficient. There was little besides the individual effort, and the personal example of isolated enthusiasts to recreate a body of traditions that would be adapted to their surroundings and would carry the force of law both within the profession itself and to the wider public. The marvel is that so much has been done by so small a group in so few years.

To-day the battle is practically won, and hereafter we shall look back upon the fusion of the American Institute of Architects with the Western Association as marking the close of the era of the struggle for existence, and the opening of the new era of assured recognition.

That this is not too hopeful a view to take may be shown by many instances, some of the most conclusive of which are marked by the entirely unconscious acceptance by the public, and by the architects of tenets that were not long ago disputed.

As slender straws showing this unconscious drift, yet convincing to any one looking back, it may be mentioned that the *names of the architects* appeared in the New York daily papers six times within a week, in connection with buildings built or to be built; that in the new and progressive districts about West End Avenue and the Riverside Drive, the names of the architects are commonly used by the real-estate agents to give added value to the really very cleverly designed speculative houses (as distinguishing them from the houses built to be occupied by the builder). During a long morning's stroll through this same district, only one watchman was found, though there may be others, who did not know who designed the houses he was in charge of, and he developed unmistakable traces of a blush, obviously at his lamentable ignorance.

To turn to more serious signs, let us note, with a word of grateful acknowledgment, the splendid services rendered to the profession by the *Century Magazine* and Mrs. Van Rensselaer, and by several other well-known periodicals. One need not doubt their entire sincerity, and yet see that their talents are turned in our direction in answer to a demand on the part of their readers.

The Architectural League particularly, and the many other kindred associations, sketch-clubs and T-square clubs springing up and flourishing in many of the larger cities, bear this same unconscious testimony to the fact that the position of architecture is recognized, and the period of struggle is being lost sight of.

The complex grows out of the simpler form, and the League thus shows its progressive tendency in that it is not simply an association of architects or draughtsmen, but has brought together the followers of architecture and of the allied arts. The election at the last annual meeting of Mr. Russell Sturgis as President and Mr. E. H. Blashfield as Vice-President, both being notably representative men, most felicitously marks this blending of kindred pursuits. The League is rapidly increasing in numbers and influence, and it is pleasant to note a growing breadth, earnestness and enthusiasm proportionate to its increasing scope and influence. There is, also, a tendency to give public expression to its opinions upon pertinent questions of public interest in a manly and properly assertive way, as in the protests against the terms of the competitions for the Grant Monument and the city buildings.

There has been in the past rather too little of this collective assertiveness, even where questions intimately affecting rights and duties were at stake. This has been due partly to the lack of fixed traditions, as outlined above; partly, perhaps, to the fact that the quasi-judicial position of the architect, as between the client and the contractor, influences his mental attitude, and leads him to weigh carefully both sides of every question, and to prefer, where rights conflict, the judicial attitude to that of the advocate.

To these same causes may be ascribed the fact that many architects have been surprised to find, and many have yet to discover, what is, nevertheless, true, and that is that the average client has no definite desire to trample him underfoot or to subject him to humiliating conditions, but acts either from simple ignorance of the architect's complex position, or from having been misled by the questionable methods in the practice of other architects, whose pride or whose backs were over-weak. In numerous instances, a temperate explanation of the duties involved, and a firm insistence upon the consideration due, have been accepted by the client in the spirit in which it was offered, and relations of mutual confidence and respect have ensued and continued.

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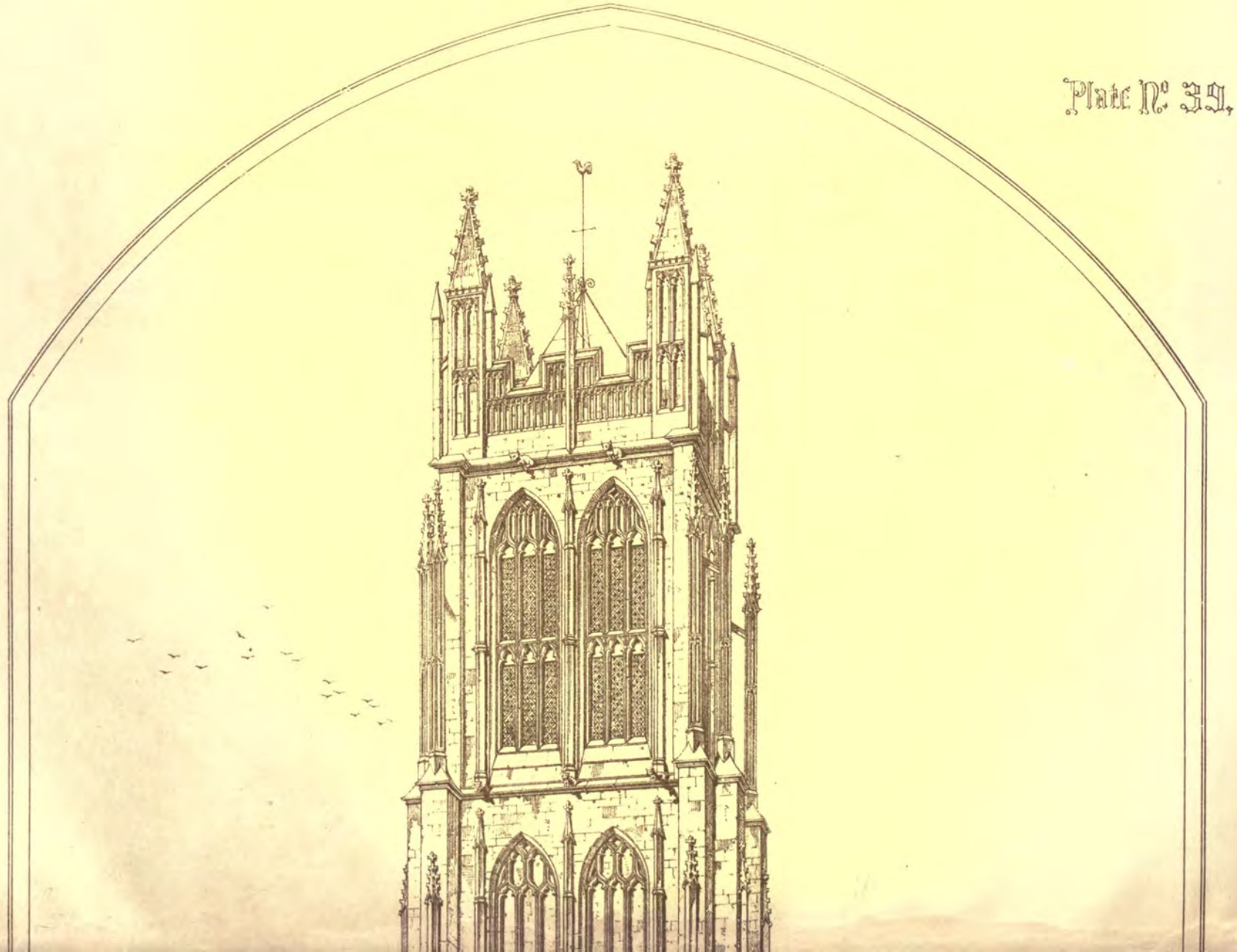
Plate N° 39.



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Saint Mary Magdalene, Chewton-Mendip.

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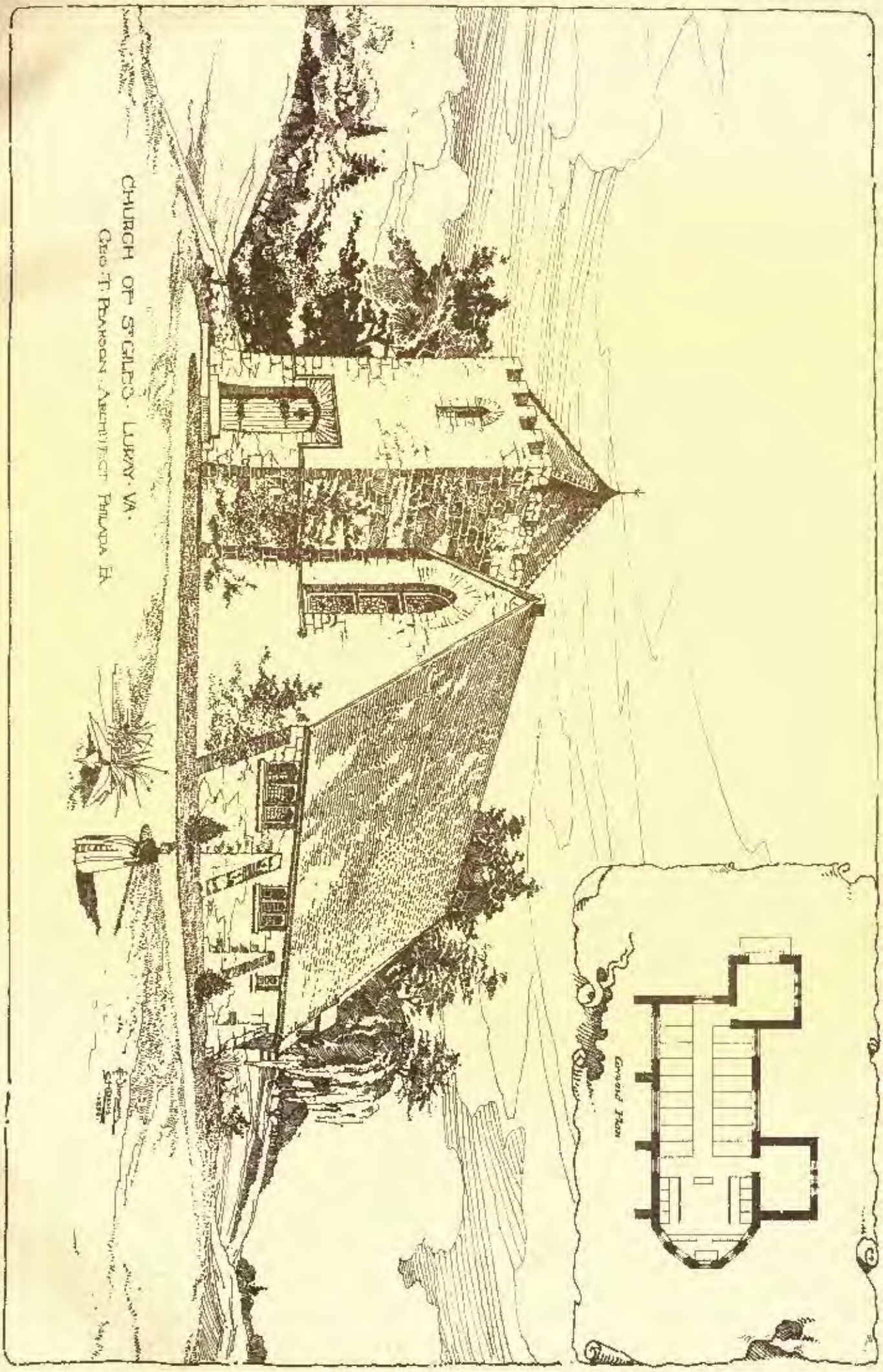

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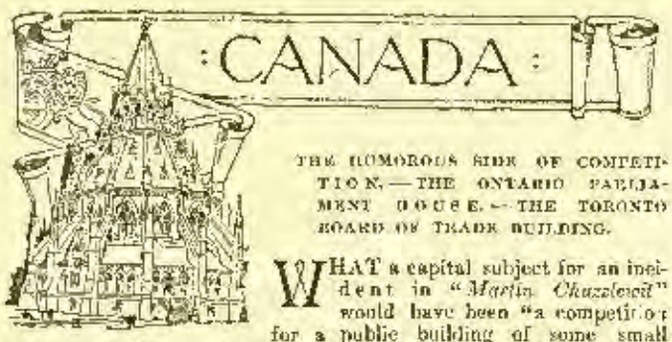
Professor Ware made the interesting announcement at the last League dinner that the first instalment of casts purchased under the Willard Trust had arrived at the Metropolitan Museum, and would soon be on exhibition. It seems that we owe what promises to be a most complete and invaluable collection of casts of architectural works to the efforts of Mr. Pierre Le Brun, who persuaded Mr. Willard to thus dispose in his will of a fortune of some eighty thousand dollars. A commission was named, consisting of the Le Bruns, father and son, and Messrs. Littell and Bloor, to expend this amount in the selecting, purchasing, and placing in the Metropolitan Museum of plaster reproductions of architectural works and details. Mr. Pierre Le Brun has visited all the places in Europe where such casts are to be had, and has succeeded in making a most interesting selection, which includes many subjects not before accessible and other interesting features.

A model of the Parthenon is being made at a scale that will make it about ten feet long and five feet wide, with all the sculptures reduced from the original marbles. This work is in charge of Mons. Chipiez, the well-known French architect and archæologist, who will also superintend the coloring of this model in accordance with the traces of color discovered by his researches. The 120 cases of casts now at the Museum represent the expenditure of only one-quarter of the fund.

What with the bequests of splendid paintings of past and present schools, made by Miss Wolfe, Mr. Marquand and others, this bequest of Mr. Willard's, and the considerable extension of the Museum building, New York will now begin to take the rank her wealth entitles her to, or, at the least, she need no longer blush at her utter insignificance.



THE HUMOROUS SIDE OF COMPETITION. — THE ONTARIO PARLIAMENT HOUSE. — THE TORONTO BOARD OF TRADE BUILDING.

WHAT a capital subject for an incident in "*Martin Chuzzlewit*" would have been "a competition for a public building of some small country-town," were the book being written now. How Dickens would have relished the humor of a dozen or so all-important village authorities — the rector, the wardens, and a few of the richer men of the parish, — beaming with self-satisfaction and radiant with complacency as they sit round the vestry-table and pass a resolution of invitation to all the architects of neighboring cities to compete for a fifteen-hundred-dollar school-room. Perhaps the rector — often the only gentlemen in the place — is not always to blame, overruled, as he is often overawed, by the loud vulgarity of a turbulent subscriber. He, poor man, has to submit and share the ridicule that such a company would call down upon itself from the humorous author.

Three invitations of this character have been in circulation recently. When publicly advertised, the invitation is clothed with a certain amount of decency, borrowed from the respectability of the press; but, when sent through the post, the true character of the people the competitor would have to deal with betrays itself. A bit of foolscap-paper, roughly torn off, just large enough to contain the words of the resolution, badly written by an office boy, enclosed with a note from the secretary of the committee, who signs his surname without initials, as if he were "my lord." Such is the amusing commencement usually.

An invitation that should have a more respectable stamp about it comes from a cathedral-owning town in Ontario. The charm about it is the innocence of the committee, "who will be happy to receive suggestions or plans for proposed alterations to the cathedral, provided they are submitted *free of cost*." This dear committee expects architects to travel three hundred miles, spend a day or so examining and measuring, and then to submit plans and suggestions on the chance of getting a job, "free of cost." In another competition for a $75,000 building, the architect whose plan is approved will be magnanimously presented with a check for $250. For this handsome remuneration he is to supply working-drawings and specification, and the whole will become the property of the committee. This may be considered a pretty good specimen, but yet there is one more, really very beautiful in its conception: a small hospital is required, the cost not to exceed $7,000; the requirements are all that is necessary and that can be put in for the money, but, say the "conditions," "any design showing that this accommodation can be supplied for a less sum will have the preference." The grammar, as well as the sentiment, is truly noble.

At a recent meeting of the Toronto Architectural Guild, the executive committee was empowered to deal with such competitions as it might think fit on its own responsibility, without reference to the Guild, the intention being to instruct these committees "in the way in which they should go." The question was raised as to why it was that the conditions did not ask for a subscription towards the buildings, to be forwarded by competing architects, together with their designs. The tariff question before the Toronto Guild had to be held over from the last meeting on account of press of other business. It was decided that the committee's report, which was read, should be printed and submitted to each member, and a special night appointed for the discussion of the matter. A matter of such great importance deserves and requires some time for its elucidation. Whatever is done must be done unanimously.

The *Canadian Architect and Builder* publishes with the January number an illustration of the design for the Provincial Parliament-House of Ontario, by Messrs. Darling & Curry, and gives in its letter-press an account of the reprehensible proceedings of the committee on the competition. It appears that the authors of the drawing published were awarded the first position, but the expert who judged the designs "did not consider them entitled to a premium because the limit of cost had been exceeded." A second competition was entered into, the result of which was that working-drawings, specifications, and details were prepared for this design and for the first premiated design. Tenders were obtained, and the premiated design came out at $942,000, and this one at $812,000. Both were Canadian firms. However, the Government would not proceed with the works because of the cost. Ultimately, they obtained a vote of $750,000, and submitted the two designs to Mr. R. A. Waite, of Buffalo, who was to decide on their relative merits. The result was, both designs were thrown out, and Mr. Waite was employed to prepare designs of his own for the building, which are now being proceeded with. The first contract let exceeds the appropriation for the entire building ($750,000).

The competition for the Toronto Board of Trade block of offices was decided on January 26 at a meeting of the Property Committee. Professor Ware returned three sets of designs with his report, and the decision remained with the Committee as to which of the three should be accepted. Nineteen sets were sent in, two-fifths of these being from architects in the States; the rest being from local architects. Messrs. James & James, of New York, are the successful men; the four invited competitors, two Canadians and two Americans, receiving each $400 for their designs. Messrs. James & James are Englishmen, who opened their offices in New York about two years ago, and their design is very prettily got up in pen-and-ink, though it is a matter of considerable doubt as to whether it can be carried out for the stipulated sum — $200,000. The Committee can hardly be said to have made the best choice, for the authors of this design appear to be little acquainted with requirements of a city such as Toronto, with regard to the office-rooms, or with the climate in reference to the heating-apparatus. Light in the corridors, elevators, back offices and main staircase, except as may be provided artificially, is apparently considered unnecessary, our bright Canadian climate being accredited with powers which it hardly possesses, such of going round corners and along long, narrow passages, shining through walls three feet thick, and beautifully illuminating offices and water-closets at the bottom of a well, enclosed with solid brick walls to, at least, fifty feet of its height. Neither are Canadians supposed to have nasal organs of very good quality, as some twenty-five water-closets and an equal number of urinals ventilate into the area which lights two offices and the staircase on every floor. Perhaps a description of this building may be wearisome to non-competitors, but so much interest has been shown not only by architects in the City of Toronto but by architects generally in the Dominion, and the people, especially of the Province, that for the benefit of those unable to see the drawings a few words may be acceptable. The Secretary tells me that several matters of detail will be reconsidered: as, for instance, the excessive size of the restaurant in the basement; the want of space for coal and the heating-apparatus; the arrangements of the banking-room which afford far too small a place for clerks and give too much for the public; the awkward arrangement of putting the secretary's office (on the Board of Trade floor) at a considerable distance from his clerk's room, and half-a-dozen such items which, it rather strikes an outsider, should have been considered before the design was accepted. A member of the Board of Trade remarked to me when I was looking at the drawings, that for his part he thought it a very unsatisfactory arrangement that the vaults for the use of tenants should be entirely separate from the offices, and cut off from them by public passages into which they open, being carried up in one stack, in, as nearly as possible, the centre of the building, necessitating long journeys on the part of tenants, with armfuls of papers and books along the public corridors, attended by a clerk to open the vault, light the necessary gas-lamp and close it up fast again after every visit to it, with perhaps a new "combination" every time. The building contains between forty and fifty offices only; a small number compared with some of the other designs, and all the rooms are about twenty feet deep, except such as may be shortened some three feet or so by cupboards and closets. The main hall of the Board of Trade suite of rooms is circular on plan, fifty feet in diameter, entailing a number of three-cornered spaces which have been worked in as closets in every direction. Externally, the design is good, in what we may call the present American style of bold features; the lower floors having heavy horizontal lintels, and the upper semi-circular heads; but the treatment of these upper stories runs into Gothic, with gables over each window of the Board of

Trade rotunda. There is a high pitched roof at the corner of the site over the rotunda, with an open turret for a finial.

The three designs returned by the Professor to the Committee were by Messrs. Darling & Curry, Messrs. Helliwell & Jordon and the accepted one. The two former firms are both of Toronto, and as has been said the authors of the accepted design are English. For a long time the design by Messrs. Darling & Curry hung in the balance with that of Messrs. James & James, it is still doubtful, whether, after all, their design may not be carried out. There is still the question of cost, which, it is possible when tenders are received, may throw out the accepted design.

OPENING OF THE HAWARA PYRAMID.

MR. W. F. FLINDERS PETRIE has at last accomplished the difficult task which he began last season. He has succeeded in forcing an entrance into the sepulchral chamber of the Pyramid of Amenemhat III. at Hawara, in the Fayûm. In our last report of Mr. Petrie's work, we related how he had tunnelled a passage from the north face of the pyramid as far as the stone casing of the central chamber, which proved to be enormously massive and resisted all his efforts. The summer was then so far advanced and the heat had become so overwhelming that he found himself compelled, very reluctantly, to postpone the completion of his operations till the present winter. Returning to Egypt in November last, Mr. Petrie at once went back to Hawara, and began by making trial excavations at various points round the base of the pyramid, in the hope of discovering the original entrance. Failing in these attempts, he decided to call in the assistance of skilled masons from Cairo, and quarry down through the roof of the central chamber, which he had already reached last season. The fact that the roof is fifteen feet thick and that it has taken Mr. Petrie's masons some three weeks to cut a very small vertical shaft through it, gives some notion of the massiveness of the structure. Once in, the secret of the true entrance-passage was disclosed, and the explorer was free to track the path by which he might have made his way into the central chamber had he but succeeded in finding the point from which it started. That point proves to be outside the pyramid, and apparently at some distance from it; so that the tomb of the founder may have been entered from the adjoining Labyrinth, the site of which was identified last year by Mr. Petrie. This may, in fact, be what Herodotus intended to convey when he said, "At the corner of the Labyrinth stands a pyramid forty fathoms high, with large figures engraved on it; which is entered by a subterranean-passage" (Book II. chapter 148).

Entry from a distance, by means of a subterranean-passage, is a novelty in construction, and has no precedent in any of the Ghizeh pyramids (fourth dynasty), nor yet in those of the sixth dynasty, of which so many were recently opened at Sakkarah. This, indeed, is the first time that the plan of a royal tomb of the twelfth dynasty has been laid open, and it differs very considerably from the plan observed by the architects of the ancient Empire. The Great Pyramid and all the other pyramids of the Ghizeh group, the pyramid of Meydûm and the Sakkarah pyramids have the entrance-passage in the centre of the north face of the structure, and at some height from the level of the desert; but the pyramid of Amenemhat III is entered from the south side, and by an opening, not in the middle of the side, but at about one-fourth of the distance from the southwest corner. It is here that the subterranean-passage, from whatever point conducted, strikes the south face of the structure. The ups and downs of the passages in the earlier pyramids are not many, and the obstacles placed in the way of possible intruders consist chiefly of a series of massive granite portcullises, let down from above, after the mummy had been deposited in its last resting-place; but the defences of the pyramid of Amenemhat III are of a different kind, and more nearly resemble the baffling turns and windings and wells of the rock-cut sepulchre of Seti I at Thebes. It marks, in fact, the transition from the Memphite to the Theban style of sepulture. "The passage," says Mr. Petrie, "does not run straight into the chamber, but slopes down northward for some distance. Then a branch-passage leads eastward, the main line continuing on, as a blind. The branch-passage (still going eastward) ends blank, but the issue from it is by a large trap-door in the roof. This trap-door opens into an upper passage leading north, which presently turns off to the west. Here it again ends blank and another roof-trap gives access to another upper passage running farther west. This passage ends in a well leading to a short passage southward, which ends in another well now full of water. This well, I imagine, must lead to another short passage going eastward, whence a last well would ascend into the chamber."

The pyramid, as Mr. Petrie feared and expected, had been broken into and plundered long ago — probably in the time of the Persian rule in Egypt. A forced entrance has been made from the second roof-trap into the sepulchral chamber, and anything of portable value which that chamber contained has, of course, disappeared. The chamber itself, which is three feet deep in water, is all but monolithic, the floor and the four sides, up to a height of six feet (inside measurement), being hollowed out of a single block of sandstone. The dimensions of the chamber are twenty-two feet long by eight feet wide inside, and Mr. Petrie estimates the weight of the block as from one to two hundred tons. One course of stone all round supports the roofing-slabs, of which there are but three. This chamber contains one large and one smaller sarcophagus of polished sandstone, both perfectly plain and without inscriptions. A projecting plinth decorated with panelled ornaments runs round the base of the large sarcophagus. The second sarcophagus has been contrived by the insertion of a head and a foot slab between the large one and the wall, and this has been closed over by a narrow lid. There were also two boxes of polished limestone in the chamber, decorated round the base with the same panelling as the large sarcophagus. One of these is broken up. A similar kind of stone box, it may be remembered, was found in the pyramid of the Pepi-Merira (sixth dynasty), which was opened some eight or nine years ago. Some fragments of alabaster vessels have been recovered from the water in the chamber, but these, like the sarcophagi and the boxes, are uninscribed, with the exception of one fragment of an alabaster vase, which bears the name of Amenemhat III. The walls, also, as far as Mr. Petrie has been able to examine them, are quite plain, thus differing from the pyramids of Unas, Pepi, and Tota of the fifth and sixth dynasties, which are lined with religious texts of great value and interest. That the great sarcophagus is the sarcophagus of Amenemhat III, and that the pyramid is his pyramid, admits, however, of no shadow of doubt. In the ruins of the two temples adjoining the pyramid, Mr. Petrie last year found fragments of inscriptions, in which the names and titles of this king repeatedly occurred, to say nothing of classic tradition, which has consistently assigned the pyramid "at the corner of the Labyrinth" to the royal builder of that famous structure. But for whom was the second and smaller sarcophagus constructed? Mr. Petrie suggests that it may have been for Amenemhat IV, who was for several years associated with his father upon the throne; or for Queen Sebaknefrurê, who succeeded her brother, Amenemhat IV. Either conjecture is probable; but, remembering that Diodorus attributes one of the Hawara colossi to Amenemhat III, and the other to his queen, and that he further states how the revenues derived from the fisheries of Lake Mœris were assigned to this royal lady "for her perfumes and her toilette," we are tempted to inquire whether a wife so honored as this tradition implies would not have been the more likely occupant of the lesser sarcophagus?

Simultaneously with his work on the pyramid, Mr. Petrie has also been continuing his excavations in the neighboring cemetery, where he has found many large tombs of the twelfth dynasty and a few inscriptions of that period. Besides the usual yield of amulets, beads, etc., he has also found three large and quite perfect Greek deeds of the Christian period, beautifully written on papyrus, and a few more mummies of the same type as those exhibited last summer in the Egyptian Hall, Piccadilly, with panel-portraits laid over the faces of the dead. Mr. Petrie will probably next attack the pyramid of Illahun, which, it is supposed, has never been opened. It is, however, very unlikely that any pyramid has escaped being plundered by either the Persian, Roman, or Arab conquerors of ancient times. — *Correspondence, London Times.*

ILLEGAL COMMISSIONS.

IN view of the fact that many in the community believe that architects, as a rule, do accept commissions, and that successful material-men pay commissions as a matter of course, it is not strange to find movements instituted on the part of both the architects and material-men looking to a correction of public sentiment in this regard. We have already referred to the action of the architects in their professional organizations. They have taken such steps as make it inexpedient, to say the least, for any member to take a commission or fee of any kind from any one except his legal clients. On the other hand, certain leading material-men, not content with the simple denial of the assertion that they pay commissions, are energetically following up every charge of this kind, and by bringing

their accusers into court, either through libel-suit or otherwise, are showing that they are not to be trifled with in this manner. Prominent among those who are now acting in this manner are Merchant & Co., of Philadelphia. Out of a number of cases pending in different parts of the country, they have recently put their accusers to rout in two instances, to the serious financial cost of those who have carelessly asserted that commissions to architects are the reason for the preference for their roofing-plates. With still other suits pending, and being vigorously pushed, it is fair for the trade at large to assume that it is not safe to charge this house, at least, with dishonest practices. We hope their good work in this direction will receive the support it deserves, first, from others in correlated lines of trade, who, in justice to themselves, should emulate the example thus set them; and, second, from the roofers and other sub-contractors, who can be of substantial assistance in bringing offenders to the test. Commissions to architects are wrong — wrong to the man who receives them, wrong to the man who pays them, wrong to the house-owner, whose interests are trifled with whenever they are paid, and wrong to the community at large, whose fair name is tarnished by every transaction that is not strictly honest. It is manifestly appropriate that a house that has been conspicuous in its stand in the past for honesty in the tin-plate trade should lead in this movement. But we say again we hope, for the sake of good morals and good buildings, others will follow their example, and that the good work may go on to its conclusion — when no commissions will be paid, and no one will be accused of paying them. — *The Metal-Worker.*

PHILADELPHIA, February 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — We enclose you the foregoing article from the editorial columns of the *Metal-Worker*, which may be of interest to you. We have just finished *our third* suit against roofers in past five months, and have commenced the fourth against a firm who have charged an architect "with taking a commission, and our firm with paying him." As our attorney requests us to send him our check for $500 as a retaining-fee, which, he assures us, "will not be all required," you can understand what reform in the roofs means. We propose to carry this suit to the end if the cost is ten times the amount demanded, and we simply mention this to satisfy you of our intention in all such cases to stop at no expense.

Yours truly, MERCHANT & CO.

[IT is a great pity that architects will not bestir themselves as actively in their own behalf as does this generous-minded ally of theirs. The fulmination that architects — not a few, but all — are always ready to accept a bribe from material-men is to be heard on every side and is a greater menace to the profession than all the improper competitions that have ever been devised. It is a matter for the architectural societies to take up and investigate fully, if only for the selfish reason that the public may know just how it is possible for one man to do a job for one per cent or less, while his neighbor demands upwards of five per cent for what seems to be the same service. It is a matter that should receive the first attention of the new American Institute of Architects, who cannot afford to have in good-membership a single member against whom the charge of accepting a commission or bribe can be proved. The members of the new Institute should be above suspicion on this head even if they cannot design a hen-coop, or compute the commission on it. We probably hear more of these accusations than architects themselves do, and at the same time we probably hear only a tithe of what the general public hears. It is a vastly greater danger than the "competition evil" in that it is concealed. Slander and back-biting are to improper conditions of competition as the cobra is to the rattlesnake. — EDS. AMERICAN ARCHITECT.]

SOCIETIES

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.

THE ninth annual meeting of the Engineers' Society of Western Pennsylvania was held in the commodious rooms of the Society in the Penn Building, Pittsburgh, Pa., on the evening of January 22d.

The reports of the Secretary, Treasurer and Chairman of the Library Committee showed the Society to be in a very satisfactory condition. The attendance at the meetings and the general interest taken in the proceedings during the year have been, indeed, flattering, the average attendance being fifty-three. The financial status is encouraging, and the library is being increased by regular additions, much of which is due to the interest and energy of those charged with its direction.

The retiring President read his address, giving a review of the points of general interest to the members, and making some suggestions relative to future action. The election of officers for the ensuing year was held, and the recommendation of the Nominating Committee was ratified in the choice of Jno. Brashear for President; A. E. Hunt, Jr., Vice-President; Wm. Metcalf and M. J. Becker, Directors; Col. S. M. Wickersham, Secretary, and A. E. Frost, Treasurer. After the election of five new members the meeting adjourned, but the members did not retire until they had gratified themselves with the tempting collation that had been provided as a surprise by a few of the members as a compliment to their fellows. A very pleasant "sociable" was thus indulged in to the pleasure of all present, which they would do well to repeat, as it affords culture to the "social qualities" too often neglected. The next meeting will be held on the third Tuesday of February (the 18th) at which an interesting paper will be read by H. D. Hibbard on the "Thomson Electric-Welding Process."

Any engineers from other societies or other parts of the country, in Pittsburgh are kindly welcomed to call at our meetings or at the rooms at any time. S. M. WICKERSHAM, *Secretary.*

THE COLUMBUS ARCHITECTURAL SKETCH CLUB.

IN order to bring ourselves before the public, I have, as Secretary of the Club, been instructed to write to your paper and notify you of the existence of the Columbus Architectural Sketch Club.

Our Club was organized in April, 1887, and has steadily increased in membership.

We have lately moved into our cosy club-room, which has been fitted up at considerable expense.

We have meetings every Thursday evening, each of which is devoted to a special subject.

Our programme is divided into four distinct parts, *viz.:*

A monthly competition.
Papers by the members.
Free-hand sketches.
Black-board problems.

In June and December we have exhibitions of all drawings submitted in the competitions during the intervening six months.

By publishing this letter you will confer a great favor on the members of the Club. Respectfully yours,

HARRY W. LUSH, *Secretary.*

COMMUNICATIONS

FIXTURES.

ROCHESTER, N. Y., February 7, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you please explain to me through the *American Architect*, just what is meant by all the fixtures necessary to render a house fit for occupation, as mentioned in the schedule of charges of the American Institute of Architects. For instance, if a client wanted a small cupboard or locker with an elaborately carved facing built into a wall of one of the rooms, or an expensive window-seat built in somewhere, would these come under the head of fixtures? Or say a fancy sideboard or clock or other numerous articles that may be built into a house. If these are all fixtures, then the only things that are not, are chairs and tables, and if they are not, where is the line to be drawn. An answer to this will greatly oblige, Yours truly, GREEN.

[THIS is a very indefinite expression, as most architects learn to their cost. It is generally understood to mean that the architect is entitled to include, in the sum on which his percentage is reckoned, the heating-apparatus, gas-fitters', steam-fitters', electricians' and plumbers' work, and so on, although the owner may have selected his own furnace, or made a contract for his own steam or hot-water apparatus, gas-fitting, plumbing, and so on. The reason of this of course is that the architect has to consider all these things in arranging his plans, and that the owner has no right to deprive him of compensation for his skill and care on account of the trifling circumstance of having spent a few minutes, in place of the architect, in making the actual contract for the work. How far the same rule is to be applied to "fittings" in the nature of furniture is a question much discussed. Many, perhaps most, architects will select or design the mantels, and allow their cost to be added to that of the house in calculating their commission. Many others, however, consider this unfair to them, and charge ten, fifteen or twenty per cent on the cost of the mantels, as a separate compensation for selecting or designing them. While a doubt may thus exist as to whether mantels are "fittings" or "furniture," there could hardly be any in regard to sideboards or clocks, or even carved cupboards, unless these formed an essential part of the design of a room, and few clients would be unreasonable on such a point. — EDS. AMERICAN ARCHITECT.]

A CORRECTION.

NEW YORK, N. Y., February 11, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I see in No. 685 of *American Architect* a view of a house at Albany, said to be that of Charles Pruyn, Esq. It is a mistake, the house in question is the property of Robert C. Pruyn, Esq. Yours truly, ROBERT W. GIBSON.

[WE regret the mistake which was due to misinformation on the part of a correspondent in Albany. — EDS. AMERICAN ARCHITECT.]

THE GOVERNMENT EXAMINATION FOR DRAUGHTSMEN.

NEW YORK, N. Y., February 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I notice in your issue of "January 26" there seems to be an impression that the Civil Service Examination Grade is too high. As a participant I did not find it so. It consisted of practical work, such as any draughtsman, worth $5.00 to $6.00 per day is liable to be called on to perform and should be competent to do. As for the charge that none of the candidates could answer the questions, my certificate from the United States declaring that I passed the

examination is proof to the contrary. I do not wish to defend or uphold Mr. Freret in reported actions at Washington, but believe in giving credit where credit is due. Edwin R. Storer.

NOTES AND CLIPPINGS

The Burning of Rome. — Professor Lanciani's "*Ancient Rome*" throws new light upon the subject of the conflagration of Rome by Nero, or, at least, presents the matter in a manner which will appear original to many people. The burning of Rome was undertaken as a hygienic measure to accomplish better sanitation for the Eternal City. The author says: "Nero conceived the gigantic plan of renewing and of rebuilding from the very foundations not only the imperial residence, but the whole metropolis; and, as the metropolis was crowded at every corner with shrines and altars and small temples, which religious superstition made absolutely inviolable, and as the slightest work of improvement was fiercely opposed by private owners of property, and gave occasion to an endless amount of law-suits and appraisals, and fights among the experts, he rid himself of all these difficulties in the simplest and cleverest way. He ordered his favorite architects, Severus and Celer, to draw a new plan of the city, and to draw it according to the best principles of hygiene and comfort; then he caused an enormous number of wooden booths and tents to be secretly prepared, and ordered fleets of grain-laden vessels to be kept in readiness to sail from the various harbors of the Mediterranean at a moment's notice. Having taken all these precautions, and secured the success of his stratagem as far as human foresight could, Nero set the whole city into a blaze of fire, and did it so neatly that, although of the fourteen regions or wards into which Rome had been divided by Augustus, three were annihilated completely, and seven for the greater part, yet not a single human life seems to have been lost in the gigantic conflagration. The homeless crowds found a ready and comfortable shelter under the booths and tents, raised by thousands in public parks and squares; at the same time, a large number of vessels laden with grain from Sardinia, Sicily, Numidia, and Egypt appeared at the mouth of the Tiber, and relieved the emperor from any anxiety as far as famine was concerned. Even in our age of progress and material improvement and comfort, we cannot help admiring the profound wisdom shown by the two imperial architects, Severus and Celer, in designing and rebuilding the city. The straight line and the right angle were followed, as far as could be done in a hilly region, in tracing the new streets and avenues through the still smoking ruins. Hasty and irregular constructions were forbidden; the line of frontage of each new building had to be sanctioned and approved by one of the official surveyors. Large squares were opened in place of filthy, thickly-inhabited quarters. The height of private houses was not allowed to exceed double the width of the street, and porticos were to be built in front of each one, to provide the citizens with cool, sheltered walks in case of rain or excessive heat. In the rebuilding of the city, the emperor secured for himself the lion's share; and his golden house, of which we possess such beautiful remains, occupied the whole extent from the Palatine to the Quirinal, where now the Central Railway station has been erected. Its area amounted to nearly a square mile, and this enormous district was appropriated, or rather usurped, by the emperor, right in the centre of a city numbering about two million inhabitants."

The Acropolis of To-day. — The town of Athens, and especially the Acropolis, is now passing through a very remarkable period in its existence. It is with mixed feelings that even those who reside here, and whose chief interest is in archæology, look upon the sweeping alterations that have quite changed the character of its appearance. The tendency to demolish all monuments of mediæval or modern history has been allowed free play of late years; in a short time hardly anything will be left that does not go back at least to Roman times. The line will probably be drawn here, though if one regards nothing but the work of the great age of Athens as worthy of preservation, it is hard to see why (for instance) the palestal of Agrippa deserves more respect than the "Frankish tower," which certainly was more picturesque and of higher historical interest. But now it is too late to regret what may have been lost. Only two or three insignificant fragments of later walls remain, and those of quite recent period: when they are removed the Acropolis will appear — but for the wear and accidents of ages — much as it did when the so-called "Beulé gate" was first built. This is an intelligible aim, and we imagine it will now be recognized by all as the best attainable. The Acropolis can never again present that picturesque medley of historical associations and monuments of all periods that delighted the visitor twenty or thirty years ago; but we may hope, when the ugliness of recent excavations and alterations has worn off, when a painfully exact appearance of order and arrangement has been avoided (as is promised), and, above all, when the old verdure and flowers have once more spread over the whole, that a new and more purely classical charm may be found to have resulted from the temporary loss of beauty. — *Athens Correspondence London Athenæum.*

Teakwood. — So indestructible by wear or decay is the African teakwood, that vessels built of it have lasted fully 100 years, to be then broken up only on account of the poor sailing qualities on account of faulty models. The wood, in fact, is one of the most remarkable employed in human industries, on the score of its very great weight, hardness and durability, its weight varying from some forty-two to fifty-two pounds per cubic foot. It works easily, but because of the large quantity of silex contained in it, the tools employed in its manipulation are in a short time worn away; it, however, possesses the advantage of containing an oil which prevents the spikes and other ironwork with which it may come in contact from rusting. The difference between this and the East Indian teakwood, though both are used for shipbuilding, is notable; the latter, which is really the most valuable timber produced in that country, is light and easily worked, strong, durable, not liable to the attacks of insects, abounds in silex, and resembles coarse mahogany. The tree requires some sixty to eighty years' growth to produce the size of timber preferred for shipbuilding, and much of it is used in England for this purpose. — *Pittsburgh Despatch.*

Prix de Reconnaissance. — The judgment of the Prix de Reconnaissance des Architectes Américains took place at the Ecole des Beaux-Arts yesterday. It was awarded to M. Huguet, pupil of M. Blondel. Honorable mentions were given to MM. Henry, Eustache and Jonkol, pupils of MM. Gaudet, Ginain and André. — *New York Herald, January 26, Paris Edition.*

TRADE SURVEY

The chief value of many trade reviews of the day is found in the truth that the facts and conditions are already the reverse of what are set forth. Some of them are mere vehicles for erroneous opinions and statements. Much that is said is written with a view to influence public opinion wrongfully. A plain statement of facts and conditions is demanded just at this time, when the plans and programmes for the coming season are under consideration. The fact will not be disputed that at no time has the spirit of investment in Southern and Western mineral, lumber, mining and agricultural lands been stronger. Delegations of Eastern capitalists have been enjoying weeks' vacation in the newer sections of the country, looking after opportunities for investment. The outflow of Northern capital continues. A gradual appreciation of value is in progress. More industrial enterprises are projected at this time than ever. Southern journals which keep a faithful record of industrial progress prove it. The anxiety of capitalists to invest in remote localities, South and West, cannot be easily overstated. This rush means simply that land, mineral and lumber values South are appreciating, and the State assessments show it. Lumber manufacturers, ore and coal miners, iron and steel makers, and manufacturers in scores of industries, are chasing each other in their haste and greed to buy up cheap lands to hold them for the advance which increasing population and industrial activity is sure to bring. Another false impression should be corrected, viz.: the impression sought to be made by ill-informed writers of financial articles, that railroad building is practically at an end for the present in this country. Nothing is further from the truth. Since January 1, 3,500 miles of road have been projected. Prior to that date a careful estimate shows that between ten and twelve thousand miles of road were projected. This information is within the reach of any one who cares to keep posted. There are schemes incubating at this hour in Boston, New York and Philadelphia, covering contemplated operations in Canada, the United States, Mexico and South America, which swell the total aggregate of possible railroad enterprise to twenty thousand miles, a fact which can be demonstrated.

Because two thirds or so of the rail-mill capacity of the country is just at this time idle is no reason why, in ninety days, work may not be abundant. Buyers and builders are purposely holding off. Even with all the lamentations over bad railroad returns, the net earnings on the trunk lines in 1888 were only $3,000,000 less than in 1887. The iron-makers have been for months steadily increasing their production, and stocks to-day are practically unknown. The lumber manufacturers have sold their stocks down lower than usual, and are now awaiting the opportunity to pile up heavier stocks for the requirements of the coming season. The margins in trade are no closer than usual, failures are not shown to be more numerous, and general indebtedness is not increasing. In financial affairs there is no need of apprehension. Since 1879, the circulating medium has increased from $827,000,000 to $1,400,000,000 in round figures, and gold has increased $420,000,000. With pessimists, facts like these go for nothing. The sunshine side of business is unwelcome. Legitimate industry is well paid. Speculators have but little chance. Yet all is not smooth sailing in the business world. The trusts are thriving. New ones are coming up. Their profits are encouraging the spirit of combination, especially in financial affairs, but all these signs do not portend evil because of the general necessity for enlarged facilities for the transaction of business, just as eighty and ninety ton engines are found necessary on railroads, and 500-horse-power Corliss engines are found necessary in shops in place of 10-horse-power engines. Architects and builders may be as ignorant as some of their critics say they are, but any anxious inquirer can ascertain in any of the larger cities that there is fully as much work projected, and in some cities more than at this time last year. Civil, mechanical, and mining engineers of repute and experience do not say that there is any decline in work in their special fields. On the contrary, some of the most noted have stated, since January 1, that the volume of work is larger. This is proved by reports from the larger machine-shops where heavy machinery is made.

New mining enterprises are calling for a great deal; irrigation companies are large buyers; municipalities are large buyers of equipments and plants for gas, water and electricity. The bridge-builders are not working fewer hours this winter than they have worked for several years, and labor itself is no more unemployed than it has been for years at this season. Yet, there is no boom in sight. Producing capacity is being expanded just as rapidly as it is safe to do so. Borrowed money is very generally in safe hands. Our financial institutions are sound; our railroad-managers are in better shape than three months ago, although still badly enough off because of excessive competition and mileage. Shrewd and far-sighted business management are more in demand than ever in our history, because of the multiplication of agencies of all kinds, and the building up of so many new competing sources and centres, cornered schemers, defeated speculators, disemployed professional talent and incompetency of all kinds seek naught but trouble ahead, and observes only the reverse of the truth in plain statements of trade facts. It is a fact patent to all that there is now less idle capital than over, and less idle labor than perhaps with one or two exceptions; that more houses were built in the country last year than ever in our history, and that the volume of business was larger, with one exception, than in our entire history. The country is in a transition state, but it is not in danger. Its financial system is not a permanent one, but the wisdom of its business men will solve the question of establishing a better one when the time comes. The complainers and fault-finders with business conditions and facts to-day are in the ranks of the incompetents.

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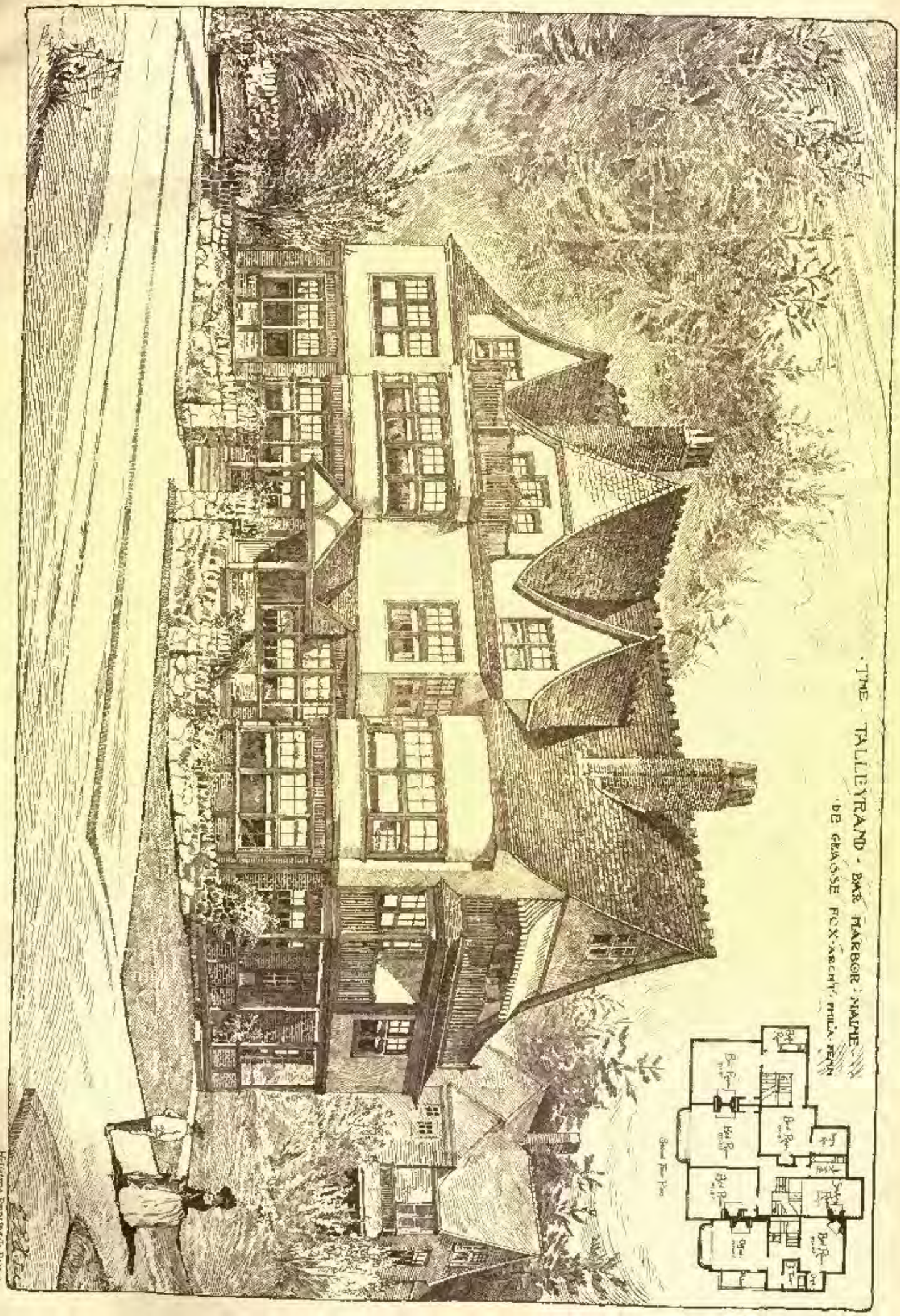

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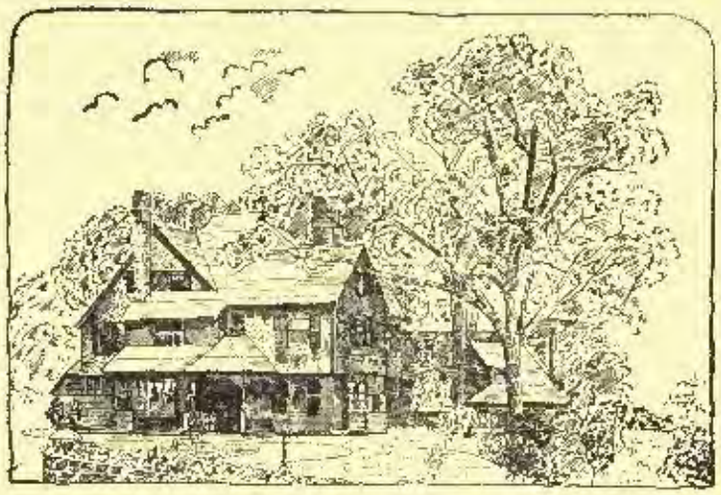

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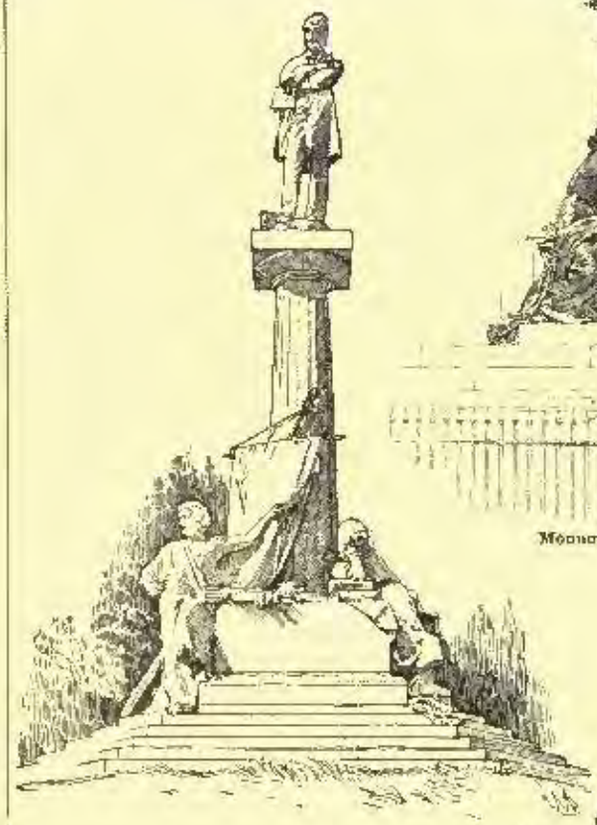

Monument to Manzoni, Milan.

Monument to Cavour, Turin.

ITALIAN STATUES.

The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Tichnor & Company, Boston, Mass. No 687.

February 23, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE profession of architecture, as well as that of engineering, has suffered a loss in the death of Mr. Edward S. Philbrick, who died last week very suddenly, like so many other members of what may well be termed the anxious professions, on his way in the train from Boston to his home in Brookline. Mr. Philbrick was born in Brookline sixty-one years ago, and was therefore hardly past the prime of his energy and usefulness at the time of his death. He graduated at Harvard College, and travelled extensively abroad while a young man. Being naturally clear-headed and observing, as well as energetic and industrious, he soon attained a high rank in his chosen profession of engineering, and the diversity of the commissions entrusted to him, with his signal success in all of them, show that his abilities were of no common order. Early in his career he was engineer to the Boston and Albany Railroad, the most important road in Massachusetts: but his independent and investigating spirit found greater satisfaction in general practice, which presented more varied and difficult problems to be solved; and most of his professional life was spent in this way. He was still quite a young man when he was chosen to represent the State of Massachusetts as engineer in the construction of the Hoosac Tunnel, and many of the most important works of water-supply and drainage in the State have been carried out either under his direction, or with help of his advice as consulting engineer. Of late years he had been much interested in sanitary engineering, rather, perhaps, as a study than a source of profit; and the books and published articles in which he gave the results of his extended experience still form a very valuable part of the literature of sanitation. Personally, Mr. Philbrick was remarkable for the dispassionate and truth-loving spirit with which he treated the problems presented to him. He had no theories, no prejudices, and no hollow enthusiasms. While he was far too kind and conscientious to reject another person's notions merely for the sake of showing the superiority of his own, he would accept no conclusion, either from himself or other people, which could not be shown to rest on a solid basis of facts; and it was, perhaps, the knowledge of this characteristic which made him more sought after, as a general consulting engineer, than any other person in the State. Although the distractions incident to the management of a large amount of property, belonging to himself and others, interfered with the number and extent of the professional commissions which he was able to carry out, they never interfered with his love for science, or prevented him from attending to the minutest details of the work which he undertook. They did, however, probably limit to some extent his reputation. It was inevitable that he should not sometimes have had to choose between staying at home, to look out for the interest and comfort of his aged mother and his own family, and accepting important commissions at a distance, which would be sure to bring him professional renown; but, notwithstanding his energetic disposition and his consciousness of his ability to carry them out successfully, he unhesitatingly chose the less brilliant, but more unselfish part, and spent contentedly at home in Brookline, or on his place at Newport, a life which he would not render more gratifying to his own ambition at the cost of the comfort of those dependent upon him.

TWO very strange building accidents have taken place this week. In Chicago, the Owens Building, a new fireproof structure, fifty feet square on the ground, and fourteen stories high, was almost completely ruined on Sunday morning by the failure of some of the terra-cotta blocks in the floors. The building was nearly completed, the floors of iron beams filled-in with flat arches of terra-cotta blocks, were all in place, the roof was on, and the iron staircase was being put up. For some reason, a part of the terra-cotta filling in the tenth floor gave way, at a time when very few men were in the building, and fell to the floor below. The arching of this floor was also weak, and the shock of the fall of the blocks from above carried it away where they struck, and the whole fell together to the eighth floor, where the same effect was produced. By the time the increasing mass had reached the fifth floor its momentum had become irresistible, and this floor, together with all those beneath it, was torn out, beams and all, and precipitated to the cellar, while the walls on which the ends of the beams rested were so badly cracked and shaken that they may have to be pulled down. Fortunately, no one was in the upper stories, and at the sound of the fall of the first terra-cotta blocks in the ninth story, the men in the lower stories, some eight or nine in number, rushed into the street just in time to save their lives. The cause of the collapse of the floor will probably be easily determined by expert examination. It will be remembered that a somewhat similar accident took place in the United Bank Building in New York very soon after its completion, the terra-cotta blocks of several of the floors falling out by their own weight. In this case it was found that some of the workmen, who were unaccustomed to the use of the flat-arch blocks, had fitted them in upside down, so that they hung by the adhesion of the mortar, and even this was diminished by the fact that they were laid in winter, many of them without removing the ice which covered them, and that the mortar froze between them. As it happened, the floors in the New York building failed singly, so that nothing was necessary but to replace the blocks and refinish, but, under circumstances a little different, the result might have been very similar to that at Chicago. The other accident reported took place at Hartford, Conn., where a hotel, built only fifteen years ago, was blown up, perhaps by the explosion of the steam-boiler in the basement, although, as no fragments of the boiler have been found, this is doubtful, and eighteen or more persons were instantly killed, while many others were severely injured.

THE Third Annual Convention of the National Association of Master Builders was held in Philadelphia last week.

From the reports in the daily papers we should say that, as is apt to be the case in conventions where the business is not previously laid out, and carried through with a strong hand, the work done was rather of the hand-to-mouth kind, the convention waiting until some one offered a resolution of some kind, and then passing or rejecting it, without looking to the establishment of any definite policy. Perhaps, however, the official report will make a different showing. Certainly, the leaders of the Association have ability and penetration enough to secure the adoption of a policy, if they see occasion for one. The most singular paper read before the convention appears to have been one sent by Mr. Hatfield of New York, but read by Mr. McArthur, in which the author is reported to have said that "the architect's position was that of an umpire, or judge, whose duty it was to guard the interests of the owner, as well as those of the builder." Why it should be the duty of the architect to guard the interests of the builder we are unable to imagine. That it is his duty to judge fairly, in controversies between the builder and the owner which he

is called in to decide, is evident enough, but that is a very different thing. However, as the paper is to be printed, and circulated among architects, as well as builders, we will not attempt to judge of it from newspaper reports. Colonel R. T. Auchmuty of New York, read a paper on "Trade Training," which was vigorously applauded, as was also its author, who concluded his reading by saying that the opposition of the trades' unions to the education of young men in such schools came from foreigners. He thought it ought not to be allowed to prevail, and called upon his hearers to control their own business, which, we venture to say, they are quite disposed to do. Resolutions in favor of exerting the influence of the Association against the repeal of the conspiracy laws, which is now being urged by the trades' unions in several States; of establishing a fire insurance company, under the auspices of the Association, to take builders' risks; and of endeavoring to secure legislation to restrain persons or associations from interfering with the efforts of American youths to learn any trade, were adopted; and Mr. E. J. Scribner, of St. Paul, was elected President for the ensuing year, Messrs. John J. Tucker of New York, and A. McAllister of Cleveland, Vice-Presidents, Mr. W. H. Sayward of Boston, Secretary, and Mr. George Tupper of Chicago, Treasurer.

THE investigation into the construction of the papier-maché ceiling over the Assembly Chamber at Albany is still going on, with endless charges, counter-charges, denials and rejoinders, but with very little result so far as any elucidation of the real matter in question is concerned. This matter, it may be necessary to explain, is not whether members of the investigating committee have been bribed to shut their eyes to the facts, or whether the newspaper correspondents have been guilty of criminal libel, but whether the papier-maché ceiling now in place is worth the two hundred and seventy thousand dollars that it cost; and, if not, who got the difference between the amount paid for it and the true value, and through whose fault did the State make so bad a bargain. The first question could be answered by experts in six hours, and the Legislature would then have some definite basis for further action. It is certain that the papier-maché cost only a fraction of the contract-price of the ceiling. The manufacturer, Mr. Sinclair, refuses to disclose what he was paid for it, but says that it was under thirty thousand dollars, and the newspaper correspondents profess to have ascertained with certainty that the exact amount was eleven thousand, five hundred dollars. If this report, which Mr. Sinclair does not deny, is correct, we shall have two hundred and fifty-nine thousand dollars as the cost of erecting a stage and putting up the new ceiling in place of the old one, with the necessary supports for it. This may, for all we know, be a reasonable price, but any first-class builder could settle the point after reading the specification and looking at the place, and the ground would then be cleared for the inquiries into the disposition of the money, about which the world outside of politics cares very little. It seems that the drawings for the ceiling were made by an architect named Howe, the seventh architect, if we are not mistaken, who has been employed on the building, without counting the experts who have been brought in for temporary service. This gentleman, who seems to have done his work well, and to have been entirely innocent of any connection with the subsequent financiering, received the usual treatment accorded to persons who furnish designs for public work in having his flat, carved-oak panels summarily converted into "dome-shaped" or "conical" caissons of paper pulp and plaster, cast in gelatine moulds, at the instance, so far as can be discovered, of the superintendent. As to the committee which had the matter of the construction in charge, and made the contracts for the ceiling, we believe that no member has yet been found who had even read the specification. Some of them had a general idea that they had signed a contract for "either a quartered or a carved oak ceiling," but they seem to have then dismissed the whole matter from their minds, until they discovered that the ceiling was likely to drop on their heads in bits of plaster-of-Paris. Perhaps we are too obtrusive in presenting the merits of the profession of architecture, but it certainly seems to us that the services of a man who would design the ceiling, and see that it was built as specified, for five per cent on the cost, would be cheaper than those of the combination of architects, superintendent and committee, who have spent more than a quarter of a million dollars in such a way that no one can tell where most of it has gone.

FIRE AND WATER calls attention again to the discussion which has been going on in the newspapers about the value of iron shutters in protecting buildings from the effect of conflagrations outside of them, and makes some very timely remarks on the subject. The history of the curious case in New York, where a building considered nearly fireproof was destroyed, with its contents, because the firemen found it for a long time impossible to open the iron shutters, or break through the brick roof, so as to throw water on the blazing goods inside, has been copied into nearly all the daily journals in this country, and many foreign ones, and, with their usual celerity in reasoning from the smallest possible number of facts, the newspaper theorists have decided that buildings would be better off without any shutters at all, and there is some danger that they may persuade owners of store property in some cases to refuse to use them. It ought to be needless to say that this would be a grave misfortune, and the underwriters' associations should be on their guard against the dissemination of such notions. Of course, the real object of shutters is to keep fire on the outside from entering a building, and they accomplish this object a hundred times for every time that they prevent firemen from reaching a blaze inside the building so protected. Moreover, there is no necessity for fastening iron shutters in such a way as to keep firemen from opening them from the outside. In New York, where burglars are more dreaded than fire as there is no insurance against their ravages, outside shutters are usually firmly secured on the inside, but in Chicago, if we are not mistaken, it is the rule to arrange the shutters so that all of them can be opened from the outside, and in many places one window in each story is protected by shutters so arranged. One of the best shutters we have seen is a patented one, which fastens on the inside, with a latch hooking over a bar, in the usual way, but has on the outside a plate, connected with a small lever passing through the shutter, by which the latch can be lifted. The plate protects the small opening through which the lever passes, and is so arranged that by directing a powerful stream of water upon it, from a fire-engine or hydrant, the lever is moved, lifting the latch, and allowing the shutters to swing open, which they do under the pressure of light springs. A shutter of this sort is as safe against fire as anything that can be made, yet it can be opened in a moment from the street by the firemen, without requiring ladders, which can hardly be used if a fire is raging on the opposite side of the street, or after the flames have burst out of the lower windows of the building to be dealt with.

A USEFUL piece of apparatus has come into use in Germany in the shape of a travelling electric light. The affair is very simple: a dynamo, with an engine to drive it, is mounted on a wagon, something like that of a steam fire-engine, containing boiler, fuel-box and water-tank, complete for a night's service. A dozen or so of jointed poles, a corresponding number of arc-lamps, and a supply of wire complete the equipment, and the whole is readily drawn by a pair of horses to the place where it may be needed. On its arrival, the poles are set up where required, and stayed with wires fastened to stakes driven into the ground; the lamps are hung to them and properly connected, and the engine is set in motion. The lamps immediately kindle, giving a light nearly as bright as day over the whole neighborhood as long as it is needed. Any number of lamps, from one to fifty, may be operated from a machine of suitable power; and as they may be suspended anywhere, and are not affected by rain or wind, it would seem that the apparatus might be very useful to contractors and others who have to carry on night-work on an extensive scale.

THE Emperor of Austria has conferred a signal honor upon the noted Vienna architect, Baron von Schmidt, who was ennobled some years ago as a reward for his professional achievements, and has now been called to the Austrian House of Lords, "in testimony of the confidence and regard which the Emperor entertains toward him." The German technical journals call this the highest honor that has ever been conferred upon an architect, and it is certainly a very great one.

BUILDERS' HARDWARE.[1]—XIX.

ORDINARY MODERN DOOR-LOCKS.

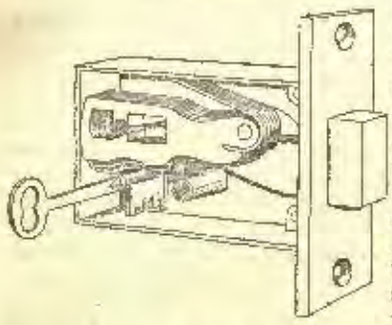

Fig. 297. Mortise Dead-lock. Russell & Erwin.

IN considering the locks at present in the market, it is manifestly impossible to even mention all of the styles and varieties, nor has it been found practicable to gather reliable data concerning all of the different makes. It is believed, however, that those illustrated will serve as fair criterions of what the market is producing. The descriptions will be limited chiefly to such as are used about an ordinary building. Time-locks, bank-locks, safe-locks, prison-locks, etc., are too complicated to come within the scope of this treatise, and are, besides, quite outside the line of what could fairly be termed builders' hardware.

An analysis of the various styles of locks can be best followed by taking the different examples according to the use to which each is put. They may, then, be classed as:

First, dead-locks.
Second, ordinary lock and latch combined.
Third, front-door locks.
Fourth, vestibule-locks.
Fifth, hotel-locks.

Any of these, except the first, may have anti-friction strikes, and may be mortise, rim, or rebate, and all can be master-keyed. Consequently in these five categories can be included all ordinary house-locks.

DEAD-LOCKS.

Figure 297 is a type of the most simple form of dead-lock, manufactured by Russell & Erwin, having five plain, pivoted levers, permitting of 120 changes in the lock by transposition of the levers. The same style of lock is made with as few as one lever. A. G. Newman manufactures a very good store-door lock, Figure 298, in which the levers slide up and down but are not pivoted together. Figure 299 illustrates the "Standard" store-door lock, manufactured by the Yale & Towne

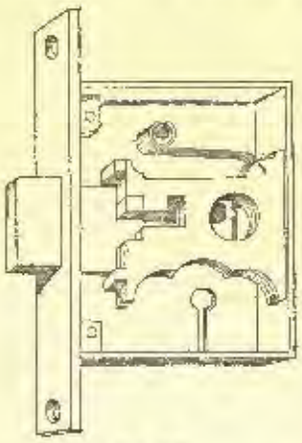

Fig. 298.

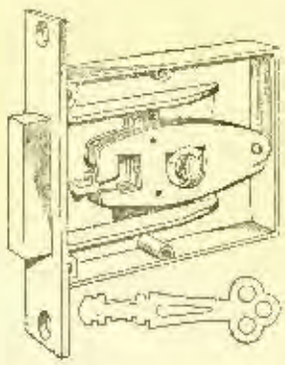

Fig. 299.

Mortise Dead-lock. A. G. Newman.

Mfg. Co., a very strong, well-made, and almost unpickable lock. The bolt-tail is the full thickness of the bolt but is made with a shell so that the tumblers work within the bolt, as it were, and the key, instead of acting against the under side of the four levers, works through the centres; and, instead of acting directly upon the bolt, simply rotates an irregularly-shaped cam. The side figure showing the bolt and the cam alone, will illustrate how this lock works. The levers in this example are of steel, as in all the "Standard" locks.

Neither of the foregoing offers any special protection against picking, except such as results from careful fitting, or, in the Standard lock, from the difficulty of reaching the levers through a small key-hole. Figure 300 shows a "Robinson" store-lock, in which the inside of the bolt-post is cut with a square notch. If an attempt is made to pick the lock by exerting a pressure on the bolt while the levers are raised tentatively in succession, the notch in the post will catch in corresponding notches on the edges of the lever gatings, holding the levers so they cannot be moved in either direction. Two of the levers only are so notched, the uppermost lever having plain gatings to prevent the posts from catching when the proper key is used. This is a hand-made lock, with all the works made of brass except the bolt-post.

Figure 301 shows another "Robinson" lock in which the post and gatings are notched in the same manner as the preceding example, but in which additional security is obtained

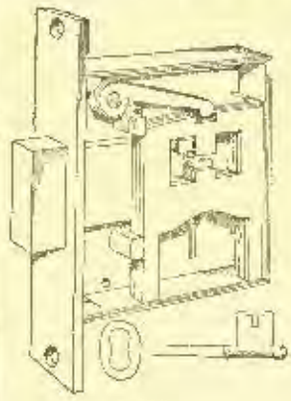

Fig. 300.

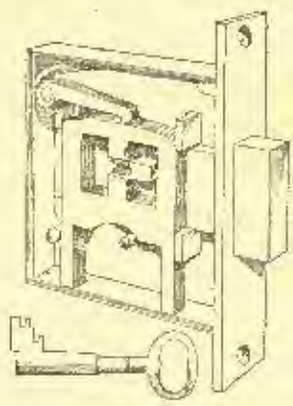

Fig. 301.

Store Locks. E. Robinson.

by attaching the post to a thin plate, sliding up and down in the bolt-tail, but held down by a spring lever such as those which work against the main levers. The post and the gatings are so arranged that if the levers could be so lifted as to bring the gatings exactly in a line, the bolt could not be moved, as the post would be too low down to pass. The post, as well as the levers, has to be raised, and on account of the notches, which prevent any tentative picking, this can be done only by the proper key. The works of this lock are all of brass, except the sliding parts of the bolt and the bolt-post which are of steel. The key is tubular, and the lock can be opened from one side only. It is an old style, and is little used at present.

A lock which is asserted to be absolutely proof against picking, is the "Dietz" lock, Figure 302. In this the locking-levers are not touched at all by the key, being separated from the key-hole by a curtain or partition on the bolt-tail, so that no wire or picking instrument can reach the levers through the key-hole. There are two sets of levers, exactly corresponding in thickness and bearing against each other only at the shoulders, as shown by the figure. The key-bits first lift the primary-levers, which are fitted with the stronger springs. The springs of the secondary or locking-levers then force the latter down in proportion as the primary-levers are raised. The secondary-levers are so arranged that the gatings are above the line of the lock-post, rather than below it as in ordinary locks, and it is evident that by raising the primary-levers to the proper heights the gatings of the secondary-levers can be brought exactly in line to permit the bolt-post to pass. But to prevent picking by the tentative process, one of the secondary-levers is made with plain gatings but the others are finely notched to correspond with notches on the post, so that if any attempt is made to force the bolt, the levers become fixed. The bolt is moved by a key-cam similar to that shown by Figure 299. The small slide at the bottom of the lock is simply to prevent the cam from turning too far. The "Dietz" lock is machine-made, but is first class in every respect, with all-brass inside works. The agents maintain that this lock never has been picked. The description may seem complicated, but the lock is very simple in action, and it is one of the most satisfactory of its kind in the market.

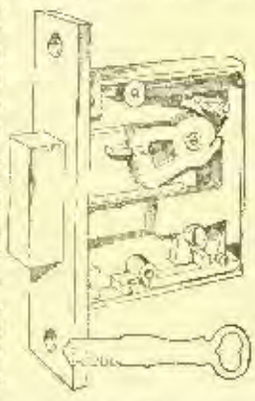

Fig. 302.

Store Lock. A. E. Dietz.

[To be continued.]

[1] Continued from page 64, No. 683.

ARCHITECTURAL SHADES AND SHADOWS.[1]

INTRODUCTORY NOTE BY PROF. W. R. WARE.

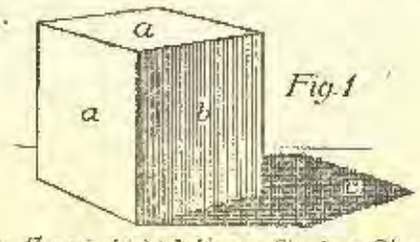

Fig. 1

a, Faces in Light. b, Face in Shade. c, Shadow.

IT is a number of years since I promised the editors of the *American Architect and Building News* that I would put in shape for publication in these columns some notes upon shades and shadows which I was in the habit of giving to my pupils. This promise I have constantly found myself unable to fulfil, and, not to keep them longer waiting, I have now, with their cordial consent, handed over my memoranda to my friend and former pupil, now my assistant and coadjutor, whose name stands at the head of this paper. In his hands the subject has been greatly developed, many new topics have been added, and the whole has been enriched by an amplitude of examples and illustrations, which makes the work as it stands mainly his own.

The ideas upon which we have worked are so simple and obvious that it seems strange that they have not long ago been fully developed. But, though their application to some special problems — as, for example, to that of the *torus* — is sufficiently familiar, especially to the students of the Ecole des Beaux-Arts, I believe that no attempt has hitherto been made to frame them into a consecutive system, and to carry to its logical conclusion the methods which those examples exemplify.

It is an obvious commonplace that almost all architectural forms and features are composed of geometrical elements — cylinders, cones, spheres, cubes and parallelopipedons, circles, octagons, and squares. In architectural drawings, moreover, the light is generally taken in a definite and uniform direction, that of one of the diagonals of a cube, and the surfaces upon which the shadows fall are generally plane surfaces, vertical or horizontal. It is plain, then, that if we ascertain, once for all, the shape of the shadows of these common geometrical figures when cast upon vertical or horizontal planes by rays of light falling at the customary angle, we shall have solved, once for all, the chief part of the problems of architectural sciography.

In pursuance of this idea, it is the plan of these papers to take up each of these geometrical figures, one after the other, and ascertain the shape of its shadow under these conditions, pointing out not only the geometrical considerations which determine its form, but the geometrical characteristics of the figure thus obtained, and the most direct method of describing it. At the same time, the shape of the *shade*, or the figure presented by the dark side of the object which casts the shadow, will be similarly investigated. Finally, it will appear that the methods pursued and the results obtained are applicable to other problems in which the conditions are somewhat less simple.

These results will be embodied in a series of formulas, or maxims for daily use, and their practical application will be exhibited in a series of strictly architectural problems, some of which will be solved in the text, by way of illustration; others will be left to the skill and patience of the reader.

It is assumed that the reader is acquainted with the elements of plane and solid geometry and of orthographic projections. Whenever it is necessary to recall them to memory, they also will be stated in the form of maxims without demonstration.

CHAPTER I. — LIGHT.

Light, direct and indirect, natural and artificial; shade and shadow; reflected light, reflected shadows, diffused light; conventional and pictorial representation; the third dimension indicated by shades and shadows; luminosity modified by color, texture, angle of incidence, contrast, and aërial perspective; maxims.

1. Light is called *direct* or *indirect* according as it proceeds from its source directly to the illuminating object, or indirectly by reflection from other objects. It is called *natural* light when it proceeds from the sun; all light of terrestrial origin, however produced, is called *artificial*. The rays which reach the earth from the sun or from any other celestial body are practically parallel, owing to the immense distance of their source. Rays of artificial light, on the other hand, radiate in every direction from their source, and the shadows cast by these divergent rays not only vary in size with every change in distance from the source of light, but are different in form from those cast by the parallel rays of natural light. The great distance of the sun also prevents those variations in the intensity of light due to differences of relative distance from the illuminated objects, which characterize artificial light.

These papers will treat only the shades and shadows cast by natural light, as the architectural draughtsman rarely, if ever, has to occupy himself with those produced by artificial light.

2. A surface is said to be *in light* when direct light falls upon it; *in shade* when it is turned away from the light. It is *in shadow* when the light is excluded from it only by the interposition of some other object. A surface in shadow is, therefore, always a surface turned *towards* the light; hence shadows can be cast only upon illuminated surfaces; that is to say, a shadow cannot fall upon a surface in shade, nor upon a surface already in shadow, except as it may be cast by a secondary or reflected light. These surfaces are often spoken of as "the light," "the shade," and "the shadow," respectively. The line which divides the light from the shade is called the dividing line of light and shade, or simply the *line of shade*. The outline of the shadow cast upon any surface is called the *line of shadow*.

3. Shade and shadow do not imply the utter exclusion of light; the darkness of the surfaces they cover is mitigated by indirect light reflected from a multitude of objects: from the earth, the clouds, buildings and trees, and from the particles of the atmosphere itself. These reflect rays of light in every possible direction, softening the shadows and lighting up corners otherwise as dark as midnight. Such light, made up of indirect rays, is called *diffused light*. Sometimes the rays from some one general direction predominate, as in the light from above on a cloudy day, or from below by reflection from a marble pavement or smooth sand, or from the side opposite the sun by reflection from vertical walls. In such cases the reflected light is sometimes strong enough not only faintly to illuminate those shaded surfaces presented most directly to its rays, but even to cast secondary shadows across them; while the shaded surfaces which are turned away from these reflected rays, and which, therefore, do not receive this subdued illumination, preserve their original intensity of darkness. This phenomenon, which may easily be verified by observation, is made use of by architectural draughtsmen to bring out architectural relief and detail otherwise lost in shadow. It is these diffused and reflected lights alone that render visible objects lying in shadow or shade: without it all shades and shadows would become mere areas of inky blackness, like the dark side of the moon. In architectural drawing, the precision and intensity of these *reflected shadows*, as they are called, are generally exaggerated, the direction of the predominant rays being assumed at such an angle as will most strikingly bring out the forms; *i. e.*, backwards and upwards to the left, as if coming mainly from the ground and from vertical walls opposite the sun. Vertical walls on the other side, being, of course, in shade, would cast no reflected light. Plate I, No. 1, illustrates this practice.

4. The object of architectural drawing being to render clear and intelligible the forms of a design, rather than to present a realistic picture, such exaggeration is perfectly legitimate. In the same way, nearly all the phenomena relating to the intensity, as well as to the direction of the ray of light itself, are treated in a precise and conventional manner, in accordance with the conventional character of all representation by elevations, sections, and plans. This may be seen by referring again to the cornice in Plate I, No. 1. In No. 3 the same cornice is drawn from actual observation which, in No. 1, is drawn according to the conventional method. In diffused light, as on the north side of a building, or on a cloudy day, the same cornice would appear as in No. 2, in which light from overhead predominates, while the reflected light is very feeble, owing to the absence of any direct light to be reflected. Reflected shadows are, therefore, wholly wanting.

5. The contrast between No. 1 and No. 2 illustrates the difference between the phenomena of direct and of diffused light, and thereby also makes clear one of the differences between architectural and pictorial drawing. The painter of figures or of still-life prefers the soft effects and delicate gradations of diffused light, as being better adapted to bring out subtile differences of texture or modelling. The works of the architect, on the other hand, stand in the full glow of the open heavens, with forms vigorous and precise, strongly relieved by deep shadows. The accessories introduced into such drawings, also, whether sculpture and carvings on the building itself, or figures, trees, or landscape in the foreground and background, are treated in a similar spirit, with broad, flat surfaces of light and shade.

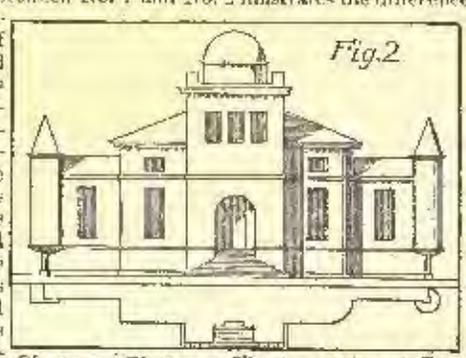
Fig. 2

Shades and Shadows on Elevation indicate the Plan.

6. Moreover as the shape of the shade depends entirely upon the form of the illuminated body, and the shape of the shadow depends partly upon that and partly upon the form of the surface on which the shadow falls, it follows that the shade and the shadow must be carefully delineated in order that they may give precise information as to the real form of the surfaces in question. This is, indeed, perhaps the chief reason for representing them at all in architectural drawings, the artistic considerations involved being of secondary

[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College.

importance. The elevation, for instance, can show only two of the dimensions of a building, its height and breadth. But if the shadows are put in, we can judge of the third dimension or depth of its various parts almost as accurately as if a plan were given, while the representation is far more vivid and attractive. In Figure 2 the shades and shadows convey a livelier idea of the true form of the building shown than an elevation without shadows, even accompanied by a plan, could convey.

7. Surfaces exposed to the divergent rays of artificial light, are, as has been said, less brilliantly illuminated in proportion to the square of their distance from its source. But though this cannot happen with the parallel rays of sunlight — (all terrestrial objects being virtually at the same distance from the sun), there are a number of other reasons why surfaces exposed to direct light are not represented as all equally brilliant. The degree of their luminosity is affected by the color and texture of the surfaces themselves, and by the angle at which the light falls on them. The darkness of surfaces in shade is affected by their exposure to reflected light, by the contrasted luminosity of the surfaces near them, and by their remoteness from the spectator.

8. *Color.* — It is hardly necessary to say in the first place, that dark-colored objects are naturally represented as less luminous than light-colored or white ones. It is worth while, however, to point out that, especially when drawings are made in black and white, this consideration is often disregarded, brick, stone, marble and wood being all represented as of the same "value."[1]

9. *Texture.* — Rough objects appear darker than smooth ones, the little eminences into which their surfaces are broken up having each a minute shade and shadow of its own, the magnitude of which depends upon the steepness of its sides and the angle of incidence of the light (Figure 3).

10. *Angle of Incidence.* — Surfaces turned fully towards the light are more brilliantly illuminated than those on which the sun shines obliquely. But it is only on rough surfaces that, through the multiplication of minute shades and shadows, as above explained, this difference is at all noticeable. The light upon a smooth column of marble, or even of sandstone, exposed to the noonday sun, appears of nearly uniform intensity, so that the curved surface looks almost flat. As the shade upon the dark side of the column, lighted only by reflected light, is also of nearly uniform intensity, it follows that whereas in-doors, where it is exposed to diffused light alone, a column or other cylindrical surface passes gradually from the highest light on one side to the deepest shade on the other, a column in sunlight shows one side light and one side dark, the light and shade meeting abruptly at the line of shade. Both are apparently flat, and the column, except for the shadows of base and cap, looks nearly square with a slightly rounded corner, instead of cylindrical (Plate I, No. 5). To avoid this effect it is customary in architectural drawings, especially those drawn to a large scale, to tone down the lights towards the line of shade, as if the stone were rough or the sun declining (Plate I, No. 4). But this should be done with moderation, and not at all when the scale of the drawing is small as in No. 5.[2]

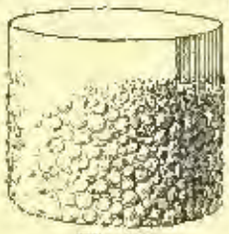

Fig 3

11. *Contrast.* — Where two surfaces of different luminosity meet, the lighter one appears by an optical illusion to be lighter and the darker one darker, along the line of contact; and, curiously enough, this is the more marked the less intense is the illumination. In a polygonal prism for example, especially if the light to which it is exposed is not very strong, each face will seem darker along the edge nearest the light and lighter on the other, than it really is, making it appear concave instead of flat (Plate I, No. 6). This is often witnessed upon octagonal chimneys, especially towards sunset. This illusion serves to heighten that mentioned in the previous section. The shade upon a round column enhances the apparent luminosity of the light side just where the diminution in the angle of the light tends to impair it, making the light side look quite flat. At the same time the light, by contrast, enhances the apparent depth of the shade where they come together, so that the line of shade forms an abrupt boundary between them (Plate I, No. 5).

12. *Distance.* — Finally, it is to be observed, that the apparent intensities of lights, shades, and colors, are alike affected by distance. This is what is called "Aerial Perspective," and is due partly to the imperfect transparency of the air, partly to the different apparent scale upon which objects at different distances are presented. This phenomenon, which is conspicuous enough out of doors, may even be detected across a room.[3] It is customary in architectural drawings somewhat to exaggerate this effect, making the more remote parts of buildings less vigorous in light and shade, as well as in color, than those nearer the eye (See Plate I, No. 7).

13. From these considerations it follows that:

First. The shade upon an object is not so dark as the shadow which it casts, since the surface in shade is, in general, turned towards the reflected light, and the surface in shadow is turned away from the reflected light and towards the shaded surface, so that it is doubly dark (See Figure 1).

Second. The line of shade is the darkest part of the surface, since it is exposed neither to the rays of direct light, like the light side, nor to those of reflected light like the dark side, both sets of rays being tangent to it. Moreover, it looks even darker than it is through the effect of contrast, as has been already pointed out. This phenomenon is often very conspicuous in nature, pebbles on a white road looking sometimes in the strong light reflected upward, as if a black thread were tied around them. (Figure 4). Even in the diffused light of a room the line of shade upon rounded surfaces is often conspicuously dark (Figure 5).

Fig. 4.

Third. Surfaces in shade or in shadow are seldom perfectly flat in tone, some parts appearing lighter or darker than others by contrast with the surfaces next them, or being really lighter in one part than another, because more exposed to reflected light or nearer to it. For reflected light being of terrestrial origin is divergent, and more powerful near its source than at a distance.

Fig 5

Line of Shade in diffused Light.

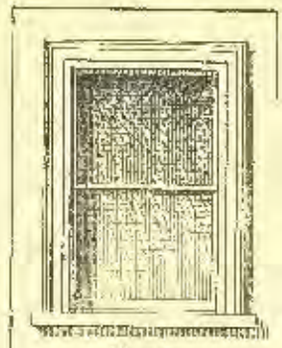

Fig. 6.

It is customary, therefore, in architectural drawings to make shades and shadows darkest next the sky, by contrast, and lighter as they approach the ground, from which the chief reflected lights are supposed to come; to make the small and narrow shades and shadows darker than the large ones; and to make the large ones darker on one edge than on the other. Window-openings and doorways are made darkest at the top as if modified by reflected light from the floors (Figure 6); but in arcades and archways the shadows are sometimes made darkest below, in recognition of the effect either of contrast with the sunlight below, or of a diffused light, doubly reflected, from the ceiling above (Figure 7). When an opening occurs within another opening, the two are generally graded in opposite directions (Figure 8, and Plate I, No. 7).

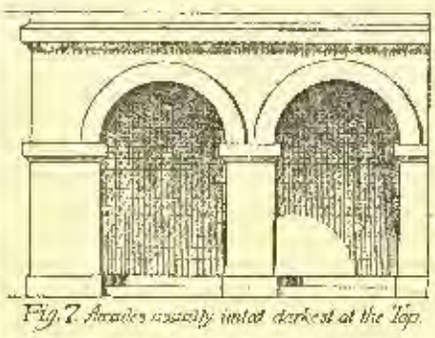

Fig. 7. Arcades usually tinted darkest at the Top.

Fig. 8. Arch & Doorway.

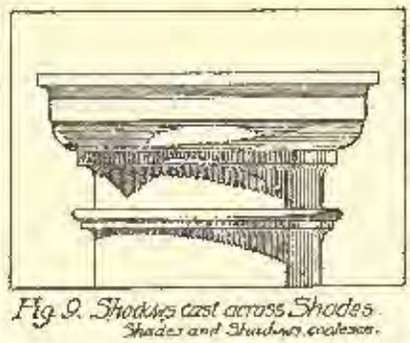

Fig. 9. Shadows cast across Shades. Shades and Shadows coalesce.

Fourth. When a cast shadow extends to the edge of the body on which it falls and consequently across and beyond its line of shade, it meets and coalesces with the shade as in Figure 9. In this case the

[1] Even in pictorial draughtsmanship this is often the case, as may be witnessed daily in wood-cuts and engravings, in many of which the local color of objects is entirely disregarded. Indeed, even in paintings, different artists and schools of art differ in nothing more than in the degree of importance they attach to the faithful representation of the relative amount of light reflected from different surfaces, or, as it is termed, to the "preservation of the values."

[2] A curious illustration of this fact is presented by the moon, which ordinarily is seen in the full glow of the sunlight upon it and looks absolutely flat. When, however, the edge of the earth's shadow falls upon it in an eclipse, in the consequent diminution of its illumination it appears perfectly globular — a reddish ball instead of the customary brilliant disc.

[3] The lights and shades in a room are so confused that it is always difficult to identify correctly the cause of every gradation of light and dark, and to distinguish between the effects of aerial perspective and those of diminished illumination.

line of shade, though obscured, exists as the line of division between the shade and the shadow, that side of the object turned towards the light being in shadow, and that turned away from it in shade. If in a drawing the shade is made lighter than the shadow, as in Figure 10, the line of shade reasserts itself and becomes again visible. As a matter of fact, however, there can be no such sudden change of intensity from shadow to shade except on adjacent surfaces meeting at an angle, for only by such abrupt change of direction can one of two adjacent portions of surface be exposed to reflected light and the other wholly deprived of it. In Figure 10 along the line of shade from *a* to *b* there is no such abrupt change of direction in the surface as would expose the shade to strong reflected light while wholly excluding the latter from the adjacent shadow. The change of luminosity would be gradual as in Figure 9, and the line of shade would exist as a mathematical and theoretic boundary between the shadow of the abacus and the shade of the echinus.

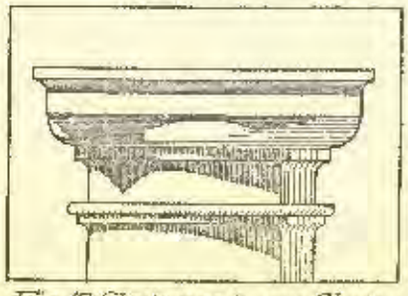

Fig. 10. Shadows cast across Shades.
Shades distinguished from Shadows by lighter Tint.

14. Summing up the considerations thus far adduced, we may state their results in the form of maxims, as follows:

I. Surfaces in shade are turned away from the light, surfaces in shadow are turned towards it. Consequently,

II. No shadow can be cast upon a surface in shade, nor upon a surface already in shadow except by reflected or artificial light.

III. None but illuminated bodies can cast shadows.

IV. Those shadows are darkest that fall on the brightest side of an object, and small shadows near large lights seem by contrast darker than large shadows near small lights. (See shadow of cap on octagonal pier, Plate I, No. 6.)

V. Shades and shadows are darkest near the edges adjacent to the light; they are lightest in those portions most exposed to reflected light, that is, those most turned away from the sun.

VI. Shadows are darker than the adjacent shades. The lightest shades (that is, those most affected by reflected light) are darker than the feeblest lights.

Maxim II is not infrequently violated, one shadow being represented as crossing another although cast by the same light, as in Figure 11. The error is manifest when we reflect that a surface already in shadow cannot be further darkened except by the exclusion of reflected, diffused, or artificial light which would otherwise reach it. Sometimes one also sees the absurdity committed of representing an *unilluminated* object as casting a shadow, as at *a*, Figure 11, which is evidently impossible, and contrary to the principle of Maxim III.

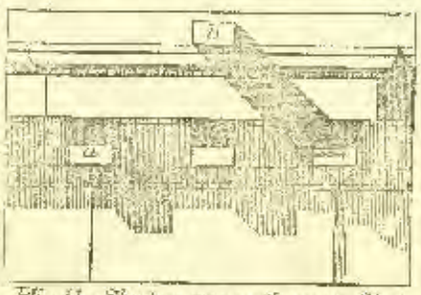

Fig. 11. Shadows incorrectly crossing Shades.

15. Plate I, No. 8, is from a photograph of a plaster cast in full sunlight. The intensity of the high lights where the solar rays are normal to the lighted surface; the delicate gradations of half-light near the lines of shade on the minutely-roughened surface of the fruit; the darkness of the line of shade; the intensity of the cast shadows, especially where contrasted with adjacent high lights and in recesses where no reflected light can penetrate; the generally darker tone of the shadows as compared with the shades, and the brilliancy of some of the reflected lights cast back into the shades, excellently illustrate the principles just set forth, and prove their foundation on the facts of nature.

[To be continued.]

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF MRS. ELDRIDGE, OCHRE POINT, NEWPORT, R. I. MR. DUDLEY NEWTON, ARCHITECT, NEWPORT, R. I.

[Gelatine print, issued only with the Imperial Edition.]

ARCHITECTURAL SHADES AND SHADOWS, PLATE I.

See article elsewhere in this issue.

CHURCH, ANN ARBOR, MICH. MR. W. G. MALCOMSON, ARCHITECT, DETROIT, MICH.

This plate exhibits the accepted design for a church building now in course of construction, under the auspices of the National Christian Woman's Board of Missions. Exterior shows roughly-squared boulder stone. Interior finish is oak and ash, natural. Estimated cost about $20,000.

DESIGN FOR THE PROPOSED MUNICIPAL BUILDING, WASHINGTON, D. C. PREPARED BY MR. W. J. FOLK.

COTTAGE AT WATCH-HILL, R. I. MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

PROBATE COURT AND REGISTRY OF DEEDS, EAST CAMBRIDGE, MASS. MESSRS. WAIT & CUTTER, ARCHITECTS, BOSTON, MASS.

EARTHQUAKES.—I.

View at Vera Cruz, Mexico.

Father Ignazio Galli, director of the astronomical observatory at Velletrie, near Rome, has just published a long and very detailed memoir on earthquakes, which casts an unexpected light upon a momentous scientific problem. Father Galli is a *savant*, very conscientious and perspicacious—one who for several years has applied himself to the fathoming of the phenomena of aerial electricity, as well as of those which are connected with terrestrial convulsions. I have the honor of knowing him personally, and I have had occasion in several conversations to notice the spirit of research, observation and critical power with which he is animated, and without which science reaches only chimerical conclusions. He is one of those churchmen who do not believe that the brutalities and mysteries of nature are at enmity with the respect which we owe to the divine being. He thinks, on the contrary, that every scientific advance enlarges the limit of human knowledge and increases the sum of lawful well-being, and the security which man enjoys in harmony with the views of Providence such as the Christian society conceives.

The work which he offers to the meditation of the world of scientists consequently deserves to be taken into serious consideration, and although consecrated to the examination of certain meteorologic and telluric phenomena, it interests in a very different way architects and engineers; for it furnishes very exact and useful indications as to the best means of protecting structures against damage by earthquake.

One of the most interesting parts of the book before us is that where the author recounts the history of the different beliefs and theories which have been current on this subject. All true *savants* have always believed that the earthquake proceeds and propagates itself by the vibration of the soil. In ancient times they had stranger notions. Pliny believed that earthquakes were a consequence of the explosion of thunderbolts in the interior of the globe. Aristotle attributed them to dry exhalations from the soil, which produced, according to him, not only these convulsions, but thunder and wind. Averroes, in speaking of the terrible earthquake which desolated the Province of Cordova, his native country, in 1139 (566 of the Hegira), mentions a plant called the "earthquake plant," and in so doing informs us that at this time they believed that the upheavals and rending of the soil had the property of giving birth to a special flower. This points without doubt, in the case of Averroes, to seeds borne from neighboring islands, perhaps the Azores, by the furious winds which ordinarily accompany this kind of phenomena; and as these seeds found the soil deeply disturbed by the violent vibrations, they prospered there rapidly, and offered to the eyes of the astonished inhabitants the fruit of an unexpected vegetation.

The invention of powder gave an unexpected appearance of truth to Pliny's theory. The effect which the explosion of mines produced made people believe that the entrails of the earth contained

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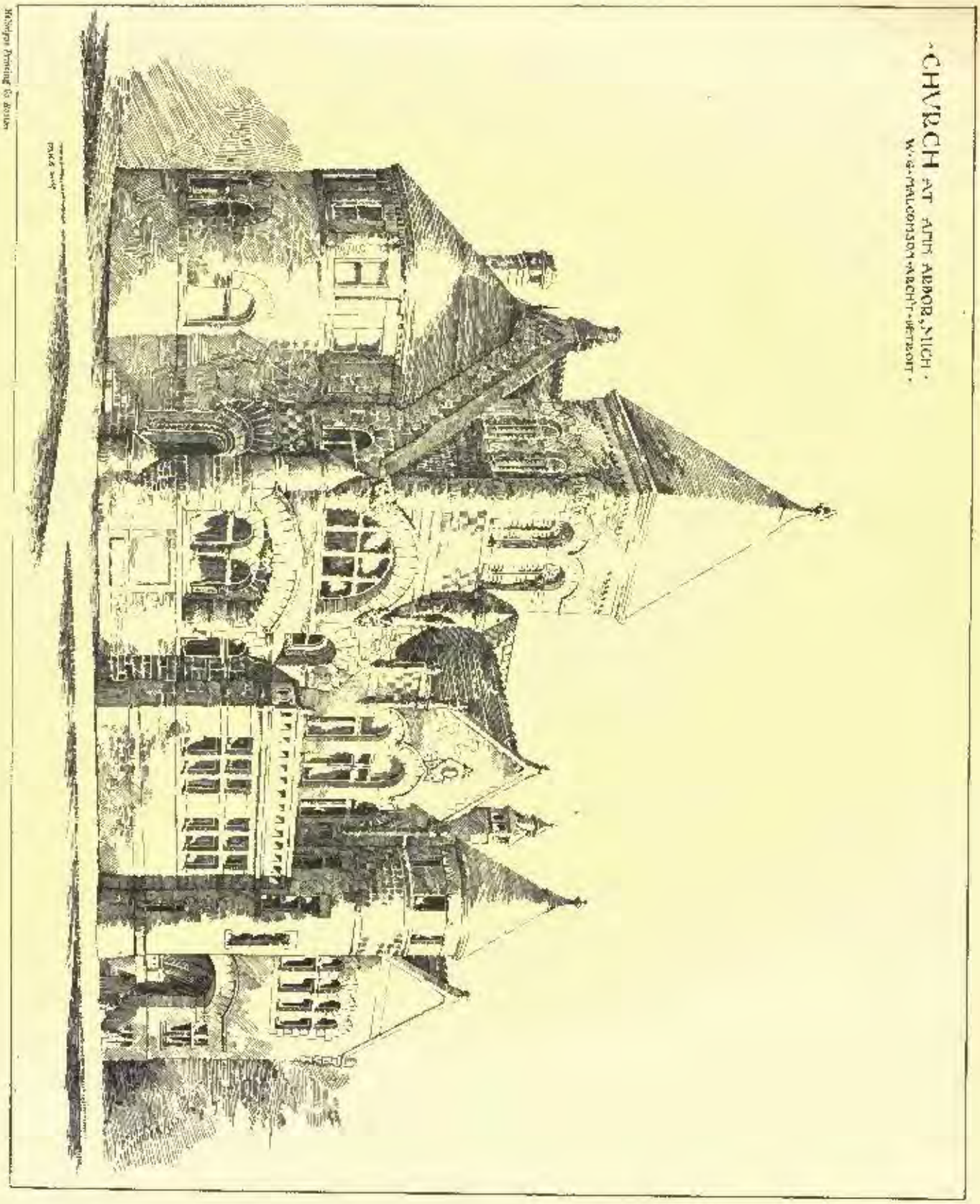

CHURCH AT ANN ARBOR, MICH.

W. G. MALCOMSON, ARCH'T, DETROIT.

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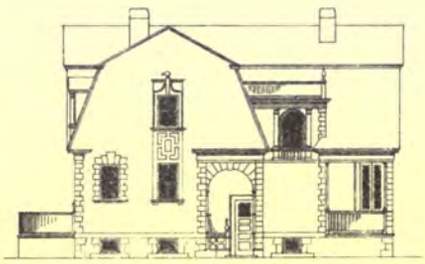
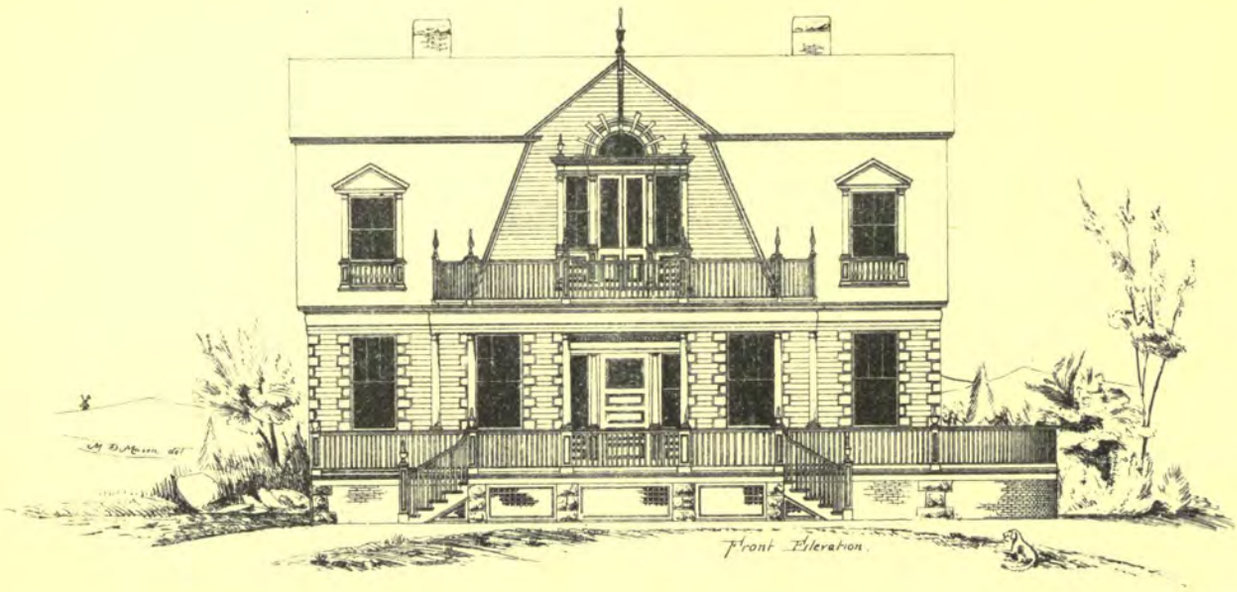
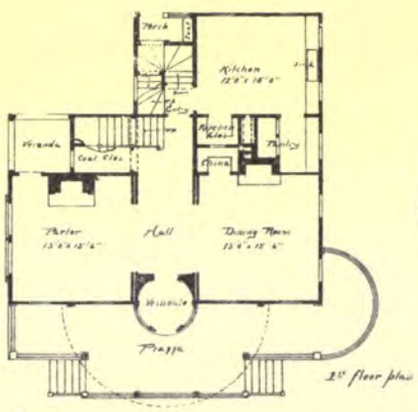


Rear Elevation

Side Elevation



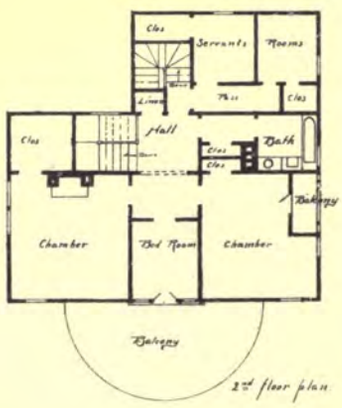
Front Elevation.



1st floor plan

ONE
OF
FIVE COTTAGES
TO BE BUILT AT
WATCH HILL R.I.

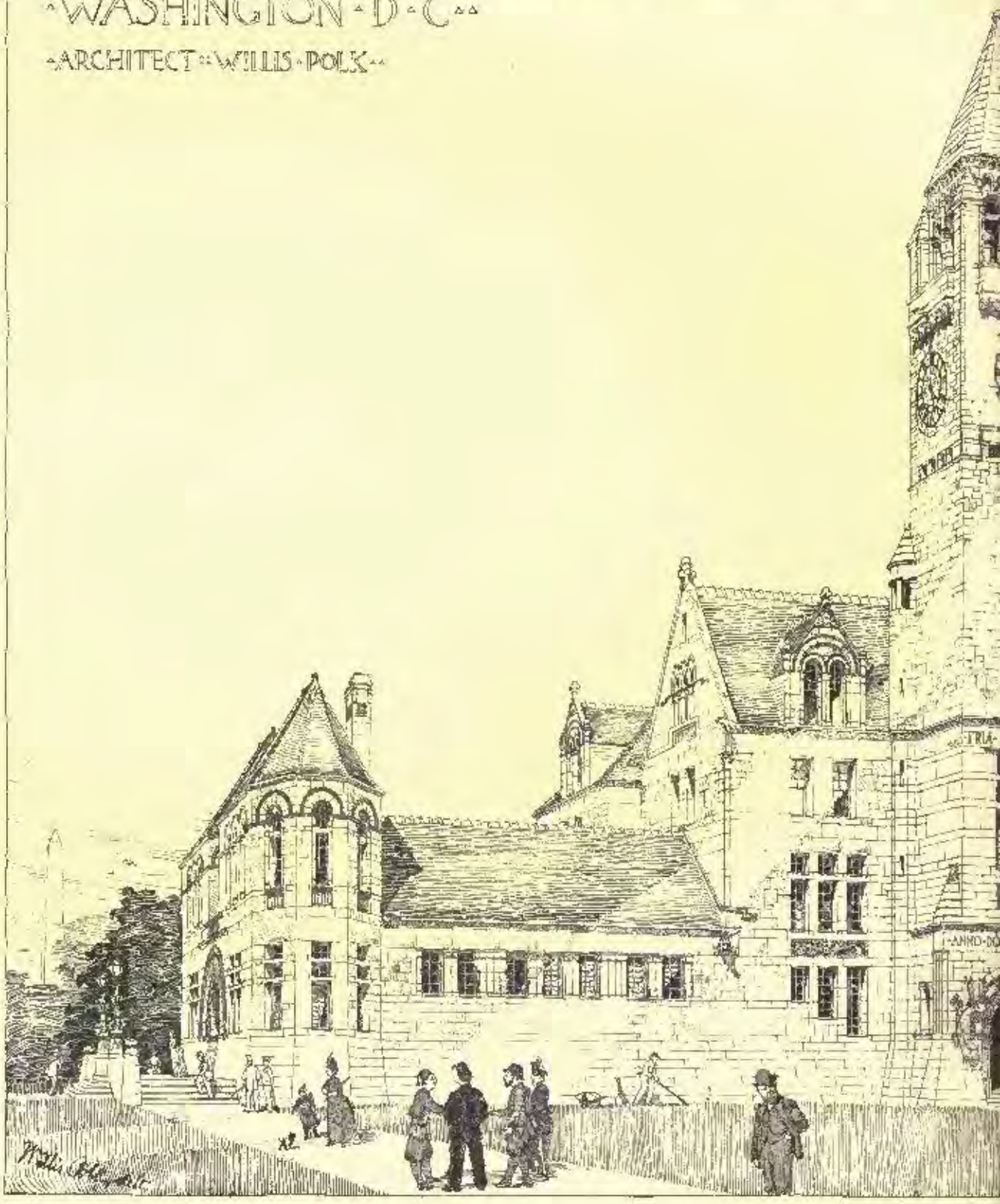
HOWARD HOPPIN, ARCH'T.
PROVIDENCE,
R.I.

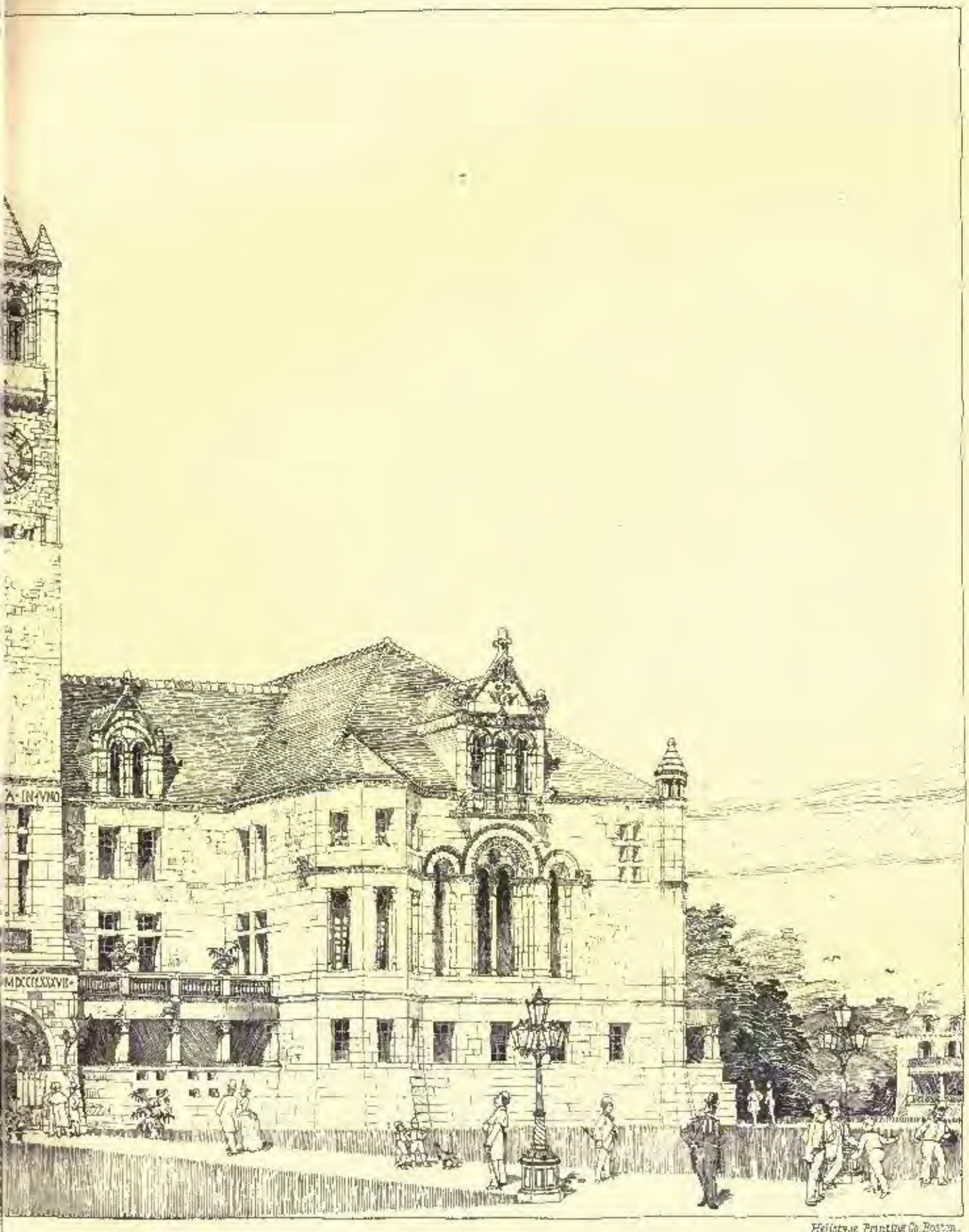


2nd floor plan

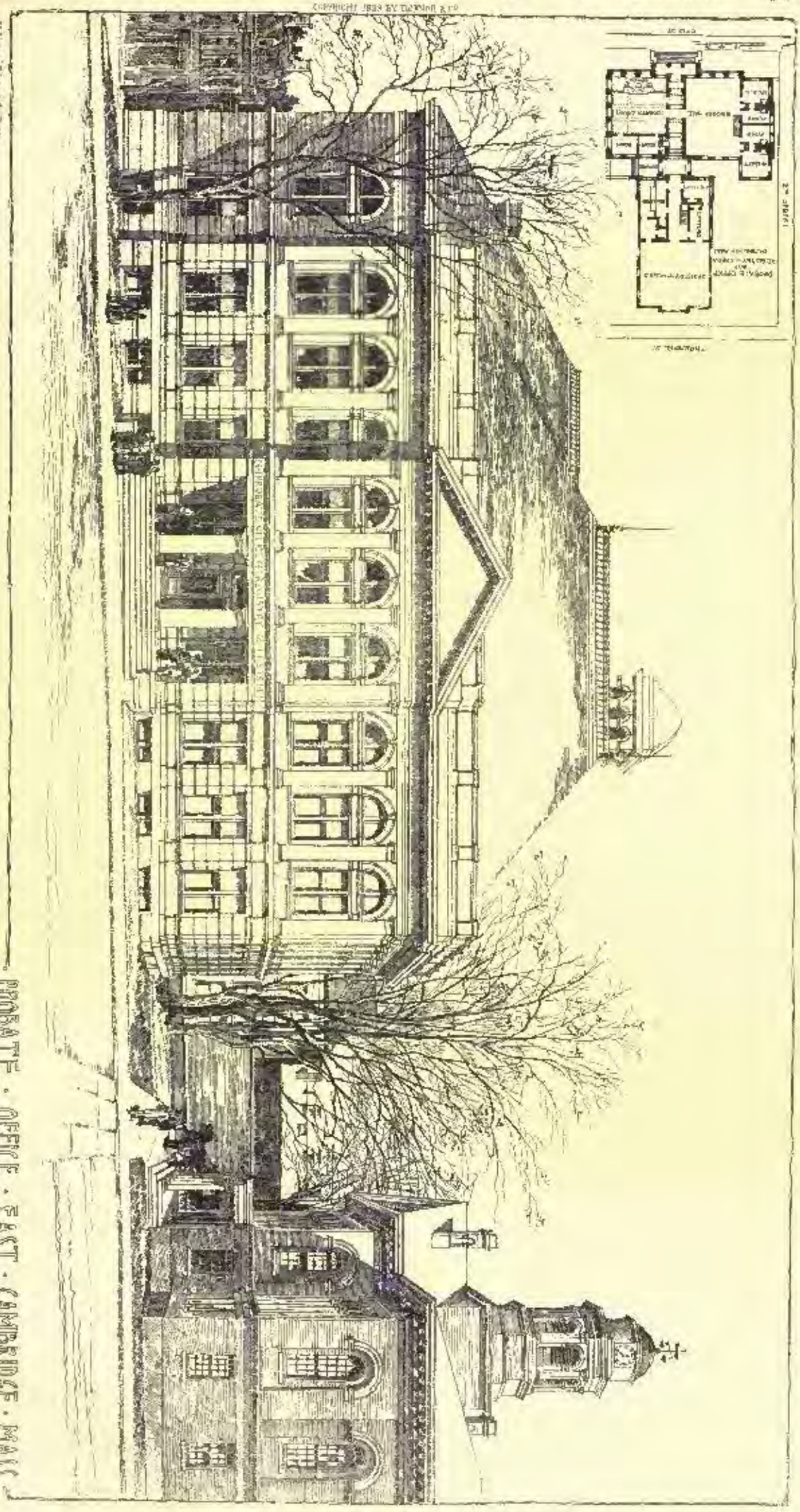
Heliotype Printing Co. Boston.

PROPOSED MUNICIPAL BUILDINGS
WASHINGTON D C
ARCHITECT WILLIS POLK





Halftype Printing Co. Boston.



PROBATE · OFFICE · EAST · CAMBRIDGE · MASS
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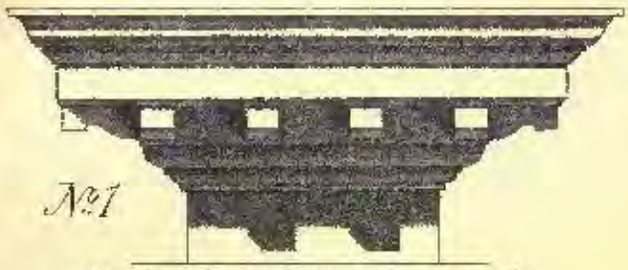
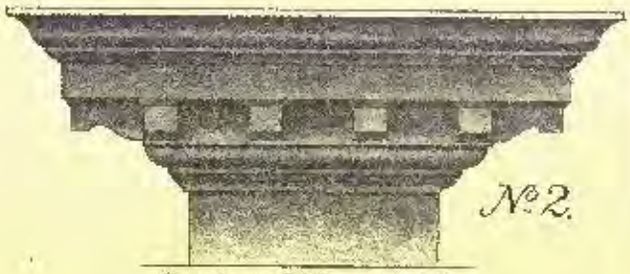
Architectural Shades and Shadows. — Plate I.



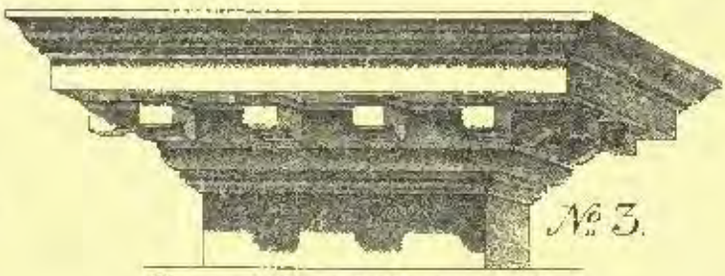
No. 1.

Cornice in Direct Light: *Conventional.*



No. 2.

Cornice in Diffused Light.

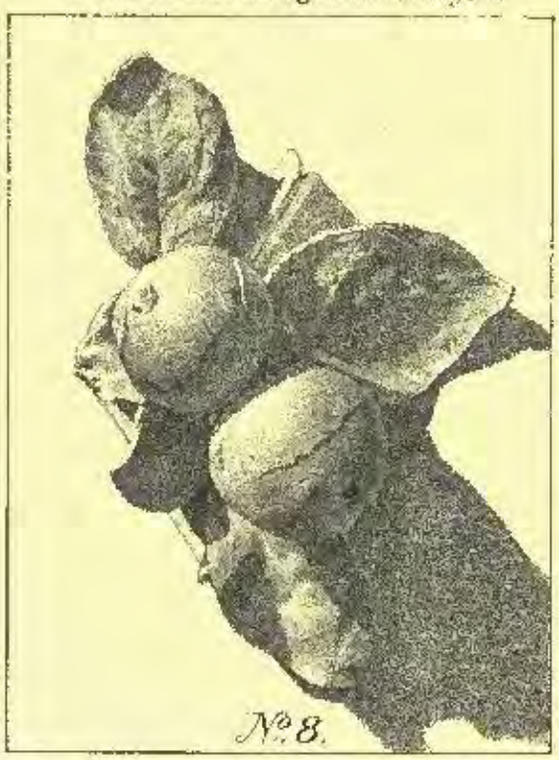


No. 3.

Cornice in Direct Light: *from the Object.*

No. 4.

Doric Column: *Large Scale.*



No. 8.

Shade & Shadow on Plaster Cast.

No. 5.

Doric Column: *Small Scale*

No. 6.

Octagonal Pier and Cap.

No. 7: Elevation showing Aërial Perspective.

A.D.F. Hamlin del. 88

Heliotype Printing Co. Boston.

deposits of sulphur and nitrous matter which the sun's heat or subterranean fires suddenly lighted, thus producing formidable explosions. They began to believe in consequence that there existed some connection between volcanoes and earthquakes, and then to the supposed action of sulphur and nitre was added that of bitumen and vitriol.

Descartes thought that the mechanical action of these hypothetical explosions proceeded from the infiltration of sea-water into the subterranean cavities, and this supposition was rejuvenated in 1884, at the time when an earthquake ravaged the south of Spain. Only a more profound study of the question has allowed us to doubt the credibility of this theory, and especially because of the enormous extent of territory sometimes affected by an earthquake.

Stukeley, in 1750, calculated that in order to shake up a zone having an extent of 300 miles, the explosion must be produced at a depth of at least 200 miles. Now no explosion could lift up a mass of this proportion, even if it were possible to accumulate at the central point of upheaval all the powder manufactured since its invention. Here are the figures: the English mile being 1609 metres. By taking a base of three as the mean specific weight of the rocky layer, we have in round figures a total weight of 60,000,000,000,000,000,000 kilogrammes. The force necessary to raise through even ten centimetres such a mass as this would be 6,000,000,000,000,000,000 kilogrammetres.

Toward the end of the last century superstition took another direction, which gradually acquired a certain resemblance to Pliny's theory. This was the time when everybody was speaking of the electric-fluid, the electric-spark and electric-explosions. Franklin's experiments were decisive, and by bringing the lightning into captivity the grand American *savant* proved that it was only the result of the condensation of fluid. From this they passed on to a belief in the incessant discharge of electric-currents between the clouds and the earth, and to the idea, very analogous to that of Pliny's, that earthquakes were only the physical consequences of internal explosions. Father Beccaria published in 1783 a very long memoir for the sake of developing this theory, which was, nevertheless, refuted by Galvani and Volta. The first admitted, at most, that the electrical whirlwinds resulting from earthquakes could strictly be the cause of certain troubles which had been observed amongst animals. As to Volta, he revolted energetically against those too generalizing minds, who, since the discovery of Franklin, explained all the hitherto unexplained phenomena of nature as being due to electricity. This momentary aberration led astray for a time the investigations of the *savants*, but little by little studies and geological discoveries brought back the attention of physicists to the mechanical process, and especially to the vibratory form of the tremblings of the earth. Before long people felt sure that at a depth of forty to fifty kilometres none of the known bodies could exist in a solid state and that the fluid mass which formed almost the whole of the terrestrial sphere must constantly be modifying its shape under the intermittent and periodical action of the moon and sun, as can be seen in the liquid masses which flow on the surface of the globe. Here we are, then, in the presence of the hypothesis according to which earthquakes are only the consequence of the shaking of the incandescent seas which are constantly in agitation under the crust of the globe. This theory, to-day almost entirely abandoned, had the advantage of fixing the investigations of certain physicists upon the nature of these shocks, and of creating a suspicion of a vibratory principle in their propagation. According to Humboldt, this principle had been suggested, in the first place, by the studies of Thomas Young on the analogy between the vibratory movement of solid bodies and that of the sound waves of the air. What is indisputable is that the theory of the vibrations of the ground was formulated categorically in 1830 by Father Pianciani. Robert Mallet and William Hopkins gave to this theory synthetic precision, and Wertheim distinguished the vibrations and waves into longitudinal and transverse. Once this point reached, the author defines with preciseness the thesis which he proposes to uphold, and which must be the proper one. What has been called, up to the present time, the movements of mass, or to word it better, the perpendicular upheavals, apropos of earthquakes do not exist. It may happen that the nature of the ground can give to the vibratory wave a concentric and saltatory form, but the general character of the phenomenon is undulatory and vibratory, and grows gradually weaker as it advances. Proof is that almost always the earthquake is superficial and does not penetrate the upper crust. Berzelius informs us that in 1823 the miners who worked in the mines of Persberg and Falhun had not the slightest knowledge of the earthquake which desolated the whole country above their heads. In 1828 the Rhenish provinces were ravaged by an analagous disaster, and the miners at Mülheim and at Ems heard no sound of it. On the 17th of March, 1872, the southeastern portion of California, notably the mineral deposits at Long Pine, was devastated in its turn. The little town which was springing into being at that place was entirely destroyed, except the wooden houses. More than a hundred shocks were counted, and yet the miners at work in the shafts had no knowledge of even one of them. The same was the case with the earthquake which took place in Virginia, in 1879. One which more recently caused some destruction in the same city was hardly perceived by the miners who were in the upper galleries. Those in the lower drifts heard no noise.

At Cesena, in Romania, at the end of an earthquake shock the population hurried in a body to the pit-shaft, believing that there had been an explosion below, and astonishment was boundless when at the usual hour the miners were seen coming to the surface unhurt, much surprised in their turn at the solicitude with which they were welcomed. They had heard nothing.

In the evening of December 30, 1883, so violent was the shock that shook the city of Donignier, near Douai, in France, that the frightened inhabitants precipitately abandoned their houses. Here the miners at work in the pits heard only a subdued rumbling, but did not perceive the least motion of the earth. M. Domeyka, Engineering General of the mines of Chili, reported to the Academy of Sciences that once on leaving the pit-shaft he found his own house thrown to the ground by an earthquake, of which, beneath the surface, he had had no indication. He added, that according to tradition, the miners believed themselves safer against earthquake shocks when they were below ground, than when they were upon its surface.

Such citations could be multiplied without stint, and would demonstrate to the farthest limit the proof that, at a depth of a few metres, the oscillation of the ground does not take place, and that between the superficial crust, where the vibrations are transmitted, and the lower strata, where the phenomenon is absolutely imperceptible, there is an intermediate layer, where it is only sensible in an acoustic form.

Finally, all the observations bearing upon this subject have equally established that earthquakes are propagated really in the form of undulations of the ground. At Albano, for instance, the inhabitants of that country were perfectly familiar, in 1823, with this phenomenon, which, for a certain length of time, was reproduced in their midst with an undesirable frequency. They saw from afar plants and trees tottering, bowing themselves and rising up again, as do the masts of ships which float upon the sea, and they stopped in the midst of their tasks in order that the undulation, of which they had had this warning, might pass on its way. A soldier, a friend of the author, told him that in 1879 he was sitting, one May evening, in the open field, and all of a sudden he felt himself lifted up and saw the ground in front of him taking the form of a receding wave-crest. Finally, in his admirable work on volcanoes and earthquakes, M. K. Fuchs describes with great minuteness these undulatory movements of the ground. The surface seems to rise up and fall back with regularity, while the movement is propagated in a determinate direction. During the severe shocks the earth seems to have lost its solidity, and resembles a moving liquid. An undulatory movement does not make itself felt merely as if the observer were in a boat, but sometimes the movement of the ground can actually be seen.

The still superficial ideas which obtained regarding the transmissibility of geological bodies seem to refute this manner of explaining earthquakes; but Father Galli quotes a very plausible example for establishing this transmissibility: If an observer takes his place at some distance from the spot where pile-driving is going on, he receives through the soles of his feet a very sensible impression every time that the hammer falls, and the intensity of this impression augments or diminishes according as he removes farther from or approaches nearer to the point of percussion. Is not this a clear proof that the soil serves as conductor for circular vibrations which diminish in force as the circumference of vibration enlarges? The same Fuchs, besides this, assures us that the transmission of the undulatory movement is sometimes very easily seen, especially in the matter of trees. Dolomieu reports that he saw, in 1783, during an earthquake in Calabria, trees bowing themselves so greatly when an undulation passed under them that their summits touched the ground. The same observation was made during an earthquake in Missouri in 1811, when the trees first bent themselves, as I have just said, and then raised themselves anew at each passage of an undulation. This interpretation would explain in a certain manner certain secondary phenomena which up to the present have remained obscure, such as the projection of a solid body to a distance during these earthquakes; crevices opening in the ground, and so completely closing up after the shock that, for example, a hen was found that had her claw caught in a crevice in the pavement after the disaster at Melfi in 1851; and, in the last place, the cloud of dust which accompanies earthquakes, and which, in a country where the land is dry and sandy, is only a consequence of strong vibrations of the ground. In Provence and Liguria, during the terrible calamity of 1887, there was clearly distinguished on the beach, and in those places where the sand is fine, such a cloud, which formed itself and then the scattered sand drifted into the air.

During the earthquake which devastated Liguria in 1887, there was also established a peculiarity worthy of the greatest attention. We know that in this province, planted with olive vineyards, there are a great number of slate cisterns of considerable depth, which serve as receptacles for the oil after the harvest. At the time when this catastrophe took place these cisterns were all full, since the harvest was but just finished. Now, not one of these spilled over, and not one of them received the slightest injury, although the water-wells were all damaged, and their waters spoiled. Even in villages which were almost entirely destroyed, these oil-cisterns were found absolutely unharmed. What, then, is the explanation of these surprising phenomena?—The difference of vibratory conductibility which exists between oil and water, and the almost absolute incapacity of the first of these substances to transmit a shock. The experiment made on this head by Father Galli, and which everybody can repeat, is a very clear demonstration. If, by the aid of a fiddle-

bow, we cause to vibrate a finger-glass filled with oil, we observe the surface of the liquid is agitated by the merest shivering. It is the same with a glass containing water covered with a film of oil. The oil presents no perceptible agitation, while pure water shudders and is disturbed, and is covered with miniature waves so long as the vibration continues. The oil, then, remains non-conducting, even when it only forms an exceedingly thin layer; and this phenomenon is very closely related to that which is produced during a storm at sea, when a certain quantity of oil is thrown upon the water. Now it is certain that the thing which saved these oil-cisterns in Liguria is the vibratory form of the shocks, for if the movement of the ground had been concentric or upheaving the bottom of the cistern would have been raised, and the liquid, overcoming the resistance of the covers, would inevitably have been spilled. H. Merlu.

[To be continued.]

BOOKS AND PAPERS.

It would seem as though there were no room in the æsthetic and literary world for another history of art, and, in a certain sense there is certainly no very crying need for many more such works as Lübke and von Reber have given to artists; still, a very tangible evidence that the lists are not yet full is afforded by William Henry Goodyear's recent "*History of Art*,"[1] a work which would seem to be more fittingly designated by the humbler title of "hand-book," as, in the three hundred pages of the volume the leading points are only touched upon. The author's familiarity with art is unquestionable, and in the distinct lines of both architecture and painting he is well-known as a writer and critic, while a long experience in connection with the Metropolitan Museum of Art is proof of his artistic appreciation. Such a work as this will then be welcomed by every one who feels the need of a concise presentation of facts in the history of art, made by one who confines himself to such statements as are indisputable, without undertaking any elaboration of details. The pages are divided pretty evenly between the arts, one-third of the book being given to architecture and about eighty pages to sculpture.

As would very naturally be expected, many of the architectural distinctions of style are lost sight of, or at least they do not seem to be preserved with the care one might wish, though the writer hits off very justly the lack of style in our modern work when he says that many or most of our buildings do not belong to any style at all, unless it be one of which we, as moderns, are unconscious. In treating the subject, a radical departure has been made from the order usually followed by writers upon the history of architecture, the modern work being considered first in considerable detail; and it is a change which subsequent writers may follow to advantage. We naturally draw our first ideas of architecture from the examples about us, and it is really only after a long training in art that one can rightly appreciate such monuments as the Egyptian pyramids or the Assyrian brick palaces. In fact, analysis is, to most minds, more appreciable and satisfactory than synthesis, and the former process of reasoning has the advantage that it is complete as far as it goes — a point which must be kept in view when writing a book such as this, which, after all, is more properly intended for the public than for those to whom art is a profession, though the same idea could be applied to a more detailed art history. Tell a student that St. Patrick's Cathedral is of French architectural extraction and Gothic — or buttressed Gothic, as Mr. Goodyear has it — by classification; that Girard College is Corinthian and Classic; that William K. Vanderbuilt's house is Renaissance and Francis I; and if he never hears another word about architecture, these buildings will be as types to him and he will have a hundredfold more knowledge of the art than if he were to give months to an investigation of the Egyptian hypostyle halls, or an elucidation of the knotty Greek hypæthral question. This seems to be exactly the idea which the writer of this history had in view, and though elaborated only to a slight degree it is sufficient to render the study of architecture interesting from the first page.

Another noteworthy feature of the book is the illustrations, and they are noticeable quite as much for the medium employed, as for the execrable manner in which they are set forth. The two hundred and five process reproductions of photographs which illustrate the work are excellent in idea, and, granting the claim that the worst photograph has some peculiar advantages over the best engraving for the reproduction of works of art, "the illustration of the book is a successful experiment as regards the use of photography, and as regards the effort to illustrate adequately a history of art in number and choice of objects." As regards the process, it is hoped that in future editions something more satisfactory may be found. There are several other methods of reproducing photo-prints, and although it would, of course, be quite out of the question in connection with a work so modest in size and in price as this, we can imagine nothing more complete as illustrations to the history of art than a series of three or four hundred of the best gelatine prints made directly from the old works of art.

As a text-book or as a handy volume to carry to Europe with one as a guide to historic art, this book seems to be peculiarly suitable, both by reason of brevity and at the same time, its completeness; and by reason of the categorical manner in which the facts are arranged and set forth. The text is sometimes a trifle dogmatic, perhaps, and yet it well shows that the history of art is not the undefined, vaguely æsthetic study some writers would have it appear, and that the old masters have a precise historic and artistic value which is not measured by individual appreciation. "Personal taste, one's chance acquaintances and surroundings, or the fashion of the hour, are apt to be disturbing elements when we use modern work as the standard of appeal for educational purposes. In dealing with the past, we stand on firmer ground. The weight of authoritative criticism is such, and its verdicts are so well-known, that the individual instructor becomes the exponent of these and must be judged by his own rendering and appreciation of them. The learner then stands in face, not of an individual teacher, but of the criticism of art as determined by its standard authorities. To develop and form an original and independent taste is the object of the learner. To offer a firm basis for this development by the suppression of individual views and by attention to the most general principles must be the object of the teacher. On the whole the matter of fact is the main thing."

These last three sentences fitly express the scope and the intent of the book.

[1] "*A History of Art*," by William Henry Goodyear, B. A.; lately Curator in the Metropolitan Museum of Art. New York: A. S. Barnes & Co. Price, $3.50.

BUILDING LAW.

THE PROPOSED "STANDARD FORM" FOR BUILDING CONTRACTS.

We have been requested to examine the form of contract adopted by the Joint Committee of the American Institute of Architects, the Western Association of Architects and the National Association of Builders, as a "standard form," to which it is hoped that all building contracts will, in time, conform.

While the end in view, viz., the drawing of all building contracts with the same general provisions and conditions which eventually would become familiar in meaning and effect to owners, architects and builders, is a praiseworthy one, we have serious doubts as to whether any such scheme is practicable; and we are unhesitatingly of opinion that this particular attempt will not commend itself to the judgment of the building public.

The chief objection to the form in question is the extended authority given to the architect: he is made the agent of the owner; he is given authority to make alteration and order extras, and to waive the provisions as to time; he is to determine the amount of loss sustained by the owner in case of delay on the contractor's part; also, whether the contractor is in such default as to justify the owner in continuing the work on his own account, and (apparently) to pass upon the sufficiency of evidence that the premises are free from liens. He is also to "direct" the work.

The real parties to this contract would seem to be the contractor and the architect, rather than the contractor and the owner of the premises; the latter having nothing to do but to promptly pay whatever bills may be incurred by the architect, howsoever much in excess of the contract price. The architect can increase the cost of the building to any extent that he sees fit, and the owner has apparently no power to get rid of him. The contract amounts, in short, to an irrevocable power-of-attorney to the architect to build such a house as he sees fit, with full power to pledge his employer's credit in payment of the bills.

We doubt if one owner in a thousand would sign a contract like this, if he fully understood its scope and meaning. There may be some special cases in which the owner is, for some reason, willing to give the architect *carte blanche* in regard to plans and cost; but, as a rule, of course, the wishes and necessities of the owner in respect to design, construction and expense, are essential conditions of the problem. Even if the owner is willing to let the architect build the house at his own discretion as to cost, it would still be unwise to clothe him with a general authority to order alterations and extras; for it must never be forgotten that the real cause of building disputes and the real question at issue between the contractor and the owner is not whether the alterations were, in fact, ordered, but whether a jury will find that they were. As the law stands to-day, before the contractor can saddle a bill for extras on the owner, he must show either that the owner himself directly ordered the work, or else that it was ordered by the architect, and that the latter had express authority to give the order. Every one who has tried building cases knows the ease with which unscrupulous contractors can, through their own evidence or that of their workmen, convince a jury that the order was given by the architect; when it comes to the second step, however, the builder's case generally fails, unless the owner did, in fact, order the extras himself, or expressly authorize the architect to do so. Under this proposed "standard form" of contract this second and most important step in the builder's case would be unnecessary; he would only have to convince the jury that the architect ordered the alterations; and the main safeguard of the owner against manufactured and fraudulent evidence would be gone.

We think, also, that this extension of the architect's authority

would be a serious annoyance and danger to him. Such a provision might, at first sight, seem convenient as permitting an architect to secure, without special consultation with his client, the execution of any work that may have been omitted from the plans and specifications. In practice, however, exactly the opposite result would be pretty sure to follow; the owner would be more indignant at the presentation after the building was done of a heavy bill for extras ordered by the architect without his knowledge, than he is now at the necessary additions to the contract price that are made known to him during the progress of the work. And, although in most cases it would be wholly unreasonable to expect that plans and specifications prepared before the work is begun should, in fact, prove coextensive with the case, and contain everything that is necessary to the completion of the building; still, it is plainly the architect's duty to make the original plans and specifications as comprehensive as he can. He is employed and paid to do that very thing; and if any omission is subsequently discovered, it is and ought to be incumbent on him to go to the owner and procure his express and special authority to make it good. The obligation to consult the owner before ordering extras is in one sense a burden to the architect, but in the end it probably gives him much less trouble than if he had the right to give orders without saying anything about them to his client. The architect should spare no time or labor in making the plans and specifications as comprehensive as he can at the outset; he should take pains to explain to the owner that in all probability there will still be some things forgotten or omitted; and, then, when such omission is discovered he should in each and every case procure the written consent of the owner to the alteration or extra. If small items have to be ordered before the owner can be reached, it should be understood that this is done subject to the owner's approval, and he should be notified at once, the architect assuming the risk until ratification by his client. This is the uniform practice in many architects' offices, and should be in all.

The proposed form of contract would prove, moreover, not only more troublesome to the architect than the existing practice, but would also be a source of pecuniary danger in a manner and to an extent that would not be apt to suggest itself to the architect, unless he has been mixed up a good deal with building litigation. Under the present practice if an owner is dissatisfied, and he often is, with the amount of the bills for extras, there is practically not much danger of the architect being held responsible. The owner cannot voluntarily pay the bills, and then sue the architect for breach of contract in ordering them; for, if the orders for extras were not given by the architect with the express sanction of the owner, the latter would not be liable to the contractor, and had no business to pay the bills. If he does not pay them the contractor brings suit, and in ninety-nine cases out of a hundred, so far as our experience goes, in fact, we might say in every instance where the owner is financially responsible, the suit is brought against him rather than against the architect. In such suit the architect is a witness as to the authority given him by his client; if it was given, he, of course, so testifies, and that generally settles the case in favor of the contractor. Judgment being rendered for the contractor and paid by the owner, the latter cannot turn round and sue the architect, for the very basis of the judgment against him in the contractor's suit was that he had given express authority to the architect to order the work. If the contractor is unsuccessful in his suit, that, of course, ends the controversy as between the architect and owner, leaving the former still open to a suit with the contractor. In this suit the contractor cannot succeed unless the architect, in fact, ordered the extras; and, if he did so without authority from his client, he has only himself to blame.

Let us see now what the course of events would be under this proposed "standard form." The contractor sues the owner for the price of extras which he claims were ordered by the architect. He is relieved from proving that the architect had any authority in fact, because the contract has made him the owner's agent for the purpose of ordering alterations and extras. He recovers a judgment for the amount of his bill and interest. The owner thereupon sues the architect for breach of some private understanding that he may have had, or claim to have had with him, to the effect that no extras should be ordered without special authority. In such an action the former judgment against the owner would be no bar to the latter's recovering from the architect the whole amount paid to the contractor, and the issue would be simply this: whether in the first place there was any such private arrangement or understanding between the architect and the owner; and secondly, if there was, whether it was adhered to by the architect. We think architects will hesitate before suggesting to their clients a form of contract which, by reason of its unusual provisions, would subject them to such risks as these.

A case in point has just been called to our attention as editor of this department. The owner of a large building which is just completed has been presented with bills for extras amounting to some twenty to thirty thousand dollars, and has refused to pay them, charging that the architect had no authority to order them. This means trouble for the architect of course; but there is practically little danger that he will be called upon to pay the bills himself, if, as we assume was the case, the owner did, in fact, authorize the alterations. The contractors will sue, and, if they lose, that is the end of the owner's case against the architect. If they win, the verdict will settle conclusively the fact that the owner *did* expressly authorize the extras. If, however, the proposed "standard form" of contract had been used, there would be little to save the architect from a law-suit at the instance of the owner, if the latter adhered to his position.

We have taken some pains to ascertain the practice of the profession in the city of Boston; also their opinion as to the desirability of enlarging the scope of the architect's authority in the manner proposed. We have been unable to find a single form of contract in use in architects' offices containing such a clause, or anything similar, and we have yet to find an architect who personally desires to assume the responsibility that such a change would throw upon him.

The great authority vested in the architect under this proposed form of contract is objectionable for another reason. If the architect is the agent of the owner, and the work is carried on under his direction as such agent, it is extremely difficult to hold the contractor to a strict compliance with the terms of his contract; the defence in every case is that the architect interfered and ordered the work done as it was done, and — the architect being the agent of the owner — the latter is bound to accept the defective work as a due performance of the contract.

A further special objection to the architect's being made the agent of the owner for any purpose at all is to be found in the operation of the Employers' Liability Act, passed by the Massachusetts Legislature in 1887. Section 1 of that act makes the owner responsible for accidents that arise from "any defect in the ways, works, machinery, or plant if they are the property of the owner," — and anything permanently attached to the building is the property of the owner — "if such defect arises, or had not been discovered or remedied, by the negligence of any person entrusted" by the owner "with the duty of seeing that they were in proper condition." The meaning of this clause has never been judicially construed; but it is obvious that if the architect is made the owner's agent to "direct" the progress of the work, any accident due to a defect in the stairways, floors, or anything else affixed to the building would form the basis of a very dangerous law-suit.

There is no necessity for the architect's being the owner's agent for any purpose; he prepares the plans, specifications, and contracts not as an agent of the owner, but as his confidential adviser; if he is afterwards to act as superintendent, it is much safer in all cases that such superintendence should take the form of inspection coupled with a right to condemn the work if not done properly, rather than that he should have the actual direction and charge of the work. Where all agency and control of the work is withheld from the architect, it is much easier, as already pointed out, to hold the contractor to a strict accountability, and therefore before the passage of the Employers' Liability Act, it was the almost universal practice among lawyers drawing building contracts to insert a clause that the architect should not be the owner's agent for any purpose whatsoever. Since the passage of this act such a clause seems indispensable.

Then the authority given to the architect to determine the amount of loss by the owner in case of delay, and to pass upon the right of the owner to terminate the contract when the contractor is in default, is in effect to substitute the judgment of the architect for the will of the owner in matters which the latter is fully capable of determining for himself. We are unable to see what inducement there is for owners to surrender plain contract rights of this character to the determination of third parties.

The next objectionable feature that we notice is the multitude of arbitrations provided, sometimes by the architect, sometimes by outside parties. Arbitration clauses in building contracts are never of the slightest use to the owner, and should always be omitted. This is the advice of everybody who has ever written on the subject, and is the uniform practice of lawyers who are in the habit of drawing building contracts. The reason is that there is practically no method of enforcing the arbitration clause if the other party does not choose to arbitrate, and, in building disputes, the contractor always throws the arbitration overboard if he or his lawyer think they can get more from a jury. Moreover, arbitrations are notoriously more expensive than law-suits, and are seldom satisfactory to the owner, for the reason that arbitrators, if not lawyers, are apt, in making up their award, to take into account all sorts of considerations that are legally and justly wholly foreign to the case. On the other hand, if the parties really desire to arbitrate a dispute that has arisen, they can always do it whether there is any provision to that effect in the contract or not; in Massachusetts, a peculiarly advantageous arbitration can be had by first instituting an action at law and then having it referred under a rule of court to some one of the many lawyers who are in the habit of sitting as auditors in building cases. In such proceedings the expense of the auditor is borne by the county, and the parties have only to pay their counsel. As to the many small matters of detail that are constantly arising during the progress of building operations, the architect is the natural and usual referee; but no arbitration clause is needed to make him such if the parties desire to leave the matter to him.

Lack of space forbids us to continue this criticism, or to point out the many other impracticable and objectionable features of this contract, or to refer to the omission of certain clauses and provisions which have been found extremely useful in practice, as tending to prevent litigation and to protect the rights of the owner.

We will only add that this "standard form" of contract is founded on a total misconception of the actual and proper relations of the several parties to it. The architect is employed at the outset to

draw plans, specifications and contracts, and to devote to that purpose, in the interest of his employer, all the knowledge and skill which he possesses. He occupies a position of trust and confidence, being the professional adviser of his client, and his whole and sole duty is to him. The relation is substantially the same as that between solicitor and client, and it is as much the duty of the one as of the other to draw contracts solely with a view to the protection of his employer.

Architects, in drawing contracts, though generally more competent for that purpose than lawyers, on account of their greater familiarity with building methods, should always bear two things in mind: first, that their duty is to their employer, and to him alone, and in no sense to the contractor; and secondly, that the practical question in building litigation is not whether the work was in fact done properly, but whether a jury will find that it was; not whether the contractor was in fact told by the architect, as the owner's agent, to make certain alterations, but whether the jury will believe the testimony of the contractor and his workmen that an order was given, or the testimony of the architect that it was not. If the architect is to certify the progress of the work, he stands, in so far as the execution of that duty is concerned, in a somewhat different position, being bound to consider not the interest of the owner alone, but the actual facts of the case with truth and impartiality; but, in so far as the *drawing of the contracts* is concerned, he is simply the confidential and professional adviser of the man who employs and pays him.

We are at a loss to understand how the committee of architects appointed by the American Institute and the Western Association could have drafted such an instrument as this, unless these gentlemen agree with the writer of a recent text-book that the architect is the "recognized head of the building trade," employed by the contractor, rather than by the owner, and anxious to make trouble for himself, expense for the owner, and litigation for the courts.

SOCIETIES

PHILADELPHIA CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

AT a meeting of the Philadelphia Chapter of the American Institute of Architects, held February 12, a committee was appointed to prepare a blank form of contract to be used between the architect and the owner. It is intended in this form to clearly state both the duties and the responsibilities of each party to the contract. Any blank forms of any similar contracts or any information on the subject would be very gladly received by Edward Hurst Brown, 1305 Arch Street, the Secretary of the committee.

ST. LOUIS ARCHITECTURAL LEAGUE.

At a regular meeting of the St. Louis Architectural League, held February 2, the successful competitors for December were declared to be: L. H. Seubert, First; M. P. McArdle and J. L. Wees, Second, both receiving same number of points; S. Carlisle Martin, Third. The subject was a "Mantel for the League Rooms."

The successful competitors for January were as follows: M. P. McArdle, First; L. H. Seubert, Second; E. R. Falkenheimer, Third. The subject was a "Porte Cochère for a Suburban Residence."

MISSOURI STATE ASSOCIATION OF ARCHITECTS.

Special prize competition offered by the Missouri State Association of Architects, the subject being a "Membership Certificate for the Year 1889." The successful competitors were: L. H. Seubert, First; H. E. Eames, Second.

Mr. T. B. Annon read a very interesting paper on "Construction."

Respectfully,

L. H. Seubert, *Corresponding Secretary.*

WASHINGTON CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

The Washington Chapter of the American Institute of Architects would be pleased to see any of the Institute or the Western Association members who may be visiting Washington during the Inaugural, at their room, No. 906 F Street. By calling on or addressing the Secretary, the freedom of the room will be gladly tendered them. One of the regular meetings of the Chapter will be held on the first of the month at 8 P. M., on which date the members will be pleased to meet visiting architects.

Glenn Brown, *Secretary*, 939 F Street.

BOSTON ARCHITECTURAL CLUB.

The Boston Architectural Club held its fortnightly *conversazione* Friday evening, the 15th, at the club-rooms, No. 6 Hamilton Place. The subject for discussion was "Methods and Mediums for Sketching." A few sketches in the various mediums were exhibited, and Mr. W. R. Emerson made some suggestions about architectural sketching, illustrating his remarks with sketches which he made before the Club. A sketch was first made with the pencil-point, then with pencil used flatwise, treating in masses of light and shade, rather than with lines. Next, he made a very spirited sketch with an English reed-pen, followed by one with a pen made from a stem of golden-rod, which Mr. Emerson has found to be very nearly as serviceable as the English reed-pen, and much more easily obtained. He then made one of his characteristic sketches with a common wooden tooth-pick, and finally showed what could be done with a pencil-smooch sketch. His sketches were exceedingly interesting, and were watched by the members of the Club with the closest attention.

The monthly exhibition of the Club will be held from Wednesday, the 20th to the 27th, inclusive, and will consist of water-colors by members of the Club. The list of exhibitors is quite large, including Ross Turner, E. C. Cabot, C. Howard Walker, H. C. Sturgis, F. H. Bacon, and others equally well known. The exhibition is not public, but tickets can be obtained through members of the Club.

COMMUNICATIONS

GREEK ARCHITECTURE.

Philadelphia, Pa., January 12, 1889.

To the Editors of the American Architect:—

Dear Sirs,—Permit me to explain more fully than I did in my rather hasty communication of January 25, my position in regard to the question of Grecian architecture. That the caryatid porch (so existing) of the Erectheum ever had a frieze is, I think, exceedingly improbable, for if we separate the architrave and cornice enough to insert one of the usual height (or, in fact, if we separate them at all) the proportion of outline is such as to strike the eye very unpleasantly at once, on account of the increase in height of the entablature from less than two-fifths to about one-half that of the columnar space, this proportion being greater than those corresponding in the early *Doric* temples dating approximately to the sixth century B. C. Aside from this the construction of the panelled ceiling is such as to preclude the probability of a change after the porch was built.

The fact, however, that the ante continue down to the stylobate behind the stereobatic platform, and form long vertical joints with the rubble backing of the latter, points to the possibility of the porch having existed at one time as an ordinary columnated portico built upon the stylobate, in which case the entablature may have been built as usual, this would make it in height equal to one-fourth that of the column, which proportion corresponds to those of the other porticos of the building. (These figures are merely approximate; I do not believe that the Greek architects built their temples as mathematical puzzles for the benefit of modern archæologists.) The frieze might then have been removed to preserve the correct proportion of parts when the portico was rebuilt in the caryatid order. This, of course, is merely speculative, and I should be pleased to hear of any other opinion, or anything definite upon this peculiar construction.

I did not intend to bring up the long contested question as to whether the Grecian temples received their chromatic decoration, exteriorly, at the hands of their builders, or at a later time: that they were so decorated in the best period is now, I believe, generally admitted. Neither do I wish to insist upon the ideas which long forbade the acceptance of this truth, and which are held in just contempt by "The Writer of the Article," but the fact that traces of design in crude color have been found upon the temples is not by any means conclusive evidence that the final coloring was of a debased type—either intrinsically or in comparison with our standard.

That the element of beauty in Classic art is a vital one, although thoroughly opposed to the intrinsic principles of everything associated with the romantic period is, in spite of individual preference, established by long ascendency in times perhaps productive of the greatest human culture that the world has known, and also by its subsequent, frequent resurrections. This being so, why should the Greeks—who deserve the credit not only of their own exquisite work but of so much that followed, and who were so successful in form and detail—fail in the problem of color? Such an assumption I cannot think warranted by the light already thrown upon the subject.

Will "The Writer of the Article" pardon me if I assume that it would have been a stranger insensibility on the part of Phidias, who created the chryselephantine statue of Athene—famous in Greek literature for its beauty and splendor—to have painted those of the gods and heroes without—several of which are regarded on account of their exquisite modelling to be the finest works known to modern artists—like gorgeous harlequins, or to have placed them in juxtaposition to work treated in such a manner?

Very truly, Herbert P. Kelly.

TORONTO BOARD OF TRADE COMPETITION.

NEW YORK, N. Y., February 18, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Your report on this competition, evidently inspired by a disappointed competitor, is so glaringly incorrect in every particular that we ask your permission to make the following statement of facts:

We take the "faults" referred to, in the order in which they occur.

1. As to lighting. There will not be a dark corner in the building. The staircase and elevators, together with a large proportion of the corridors, are lighted by three large windows (each 7' 0" x 4' 0") on every floor; the very short lengths of corridor from which these windows are not *distinctly visible*, will receive abundance of light from the glass-doors and fan-lights.

2. Ventilation and warming. We venture to promise that there is not a building in the Dominion of Canada more efficiently warmed and ventilated than this will be. The extreme simplicity of the general scheme of the building greatly favors us in working out these very important matters.

The water-closets and urinals are all provided with special ventilation; they will *not* ventilate into the area, but into steam-heated shafts.

3. *At our own suggestion*, the public restaurant in the basement is omitted altogether.

4. The entire basement is given up to boilers, coal, dynamos, etc.

5. There will be no banking-room at all; that was merely an alternative suggestion — not our main scheme.

6. The "clerk's room," on our original plan, owed its position to a printer's error in the "instructions," an error which we leave our critic to discover for himself.

7. Your correspondent seems to be ignorant of the fact that by surrounding the central stack of fireproof vaults with a corridor, we render them, humanly speaking, absolutely secure from fire, as well as from the attacks of burrowing burglars.

These vaults would probably be rented to the tenants of the largest offices on each floor, immediately opposite the vaults.

8. The building contains sixty-two offices, of which twenty are twenty feet deep.

Ten of these deep offices (three hundred superficial feet in area) have not less than ninety superficial feet of window area; the remaining ten have forty-five feet of window area, which is above the average allowance.

9. The "closets in every direction," on the Board of Trade floor, owing to the circular form of the large hall, reduce themselves, in actual fact to *one*, in the secretary's private office.

10. There remains the question of cost. On this matter we have a well-grounded confidence that your correspondent will be utterly disappointed

Is the dense ignorance displayed by your correspondent careless, or malicious? It savors strongly of both.

Yours truly, JAMES & JAMES.

THE COLUMBIA COLLEGE ARCHITECTURAL COURSE.

CHICAGO, ILL., January 24, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I desire to ask a few questions *apropos* of your reply to Mr. Kimball, concerning Columbia College as "the best school of architecture" in America.

By your first statement do you mean to imply that other institutions—notably the one at Boston—have not "corps of instructors of long and wide experience?" If so, I consider the statement unjust, for architecture is so largely a matter of personal instruction that tabulated diplomas and certificates of "experience" count for little in results. What do the results of training show?

Second, is a course of four years' duration, compulsorily undertaken, of more benefit in itself than a course of the same length which is voluntary?

I will not question your third statement, not wishing to enter a discussion on rival "equipments."

Fourth, in consideration of the fact that the faculty of the Ecole des Beaux-Arts—acknowledged by all to be the best school for the profession in the world—is of the so-called "narrow-minded and unprogressive" variety, is progressiveness, especially in these days of harum-scarum innovation, to be regarded as an unmixed blessing at the start?

Fifth, in consideration of your publication of architects' votes on the merits of buildings in this country, do you think that New York is the acknowledged centre of the highest architectural art in the country? Respectfully, HOWARD G. HOOKINS.

[We will print one correspondent's questions, while we must decline to answer them, since by answering we should seem to acknowledge the truth of his inference that, because we made certain absolute statements concerning Columbia College, only the converse of those statements could be true of those institutions which were not mentioned. Our correspondent's amiable *esprit de corps* has caused him to institute comparisons which were not made.—EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS

VALUE OF BERLIN REAL ESTATE.—The enormous rise in the value of property at Berlin is shown by the fact that the Hôtel du Nord has just been sold to the German Discount Society for £175,000, whereas in 1801 it was purchased for £40,000, and in 1843 for £18,000.—*London Truth.*

A POSTAL TUBE FOR THE CHANNEL.—One of our English contemporaries has the following item of interest respecting a projected postal tube under the English Channel, to be operated presumably by the pneumatic method of propulsion, though on this point "deponent saith not," viz:—"Whatever objection may be urged against the construction of a Channel Tunnel, it is not easy to discover grounds for opposing the development of a recently revived scheme. It is proposed (not for the first time, however,) to lay down a postal tube between Dover and Calais. The idea is to suspend two tubes of about a yard each in diameter by means of steel cables across the Channel, forty yards above the level of the sea. The steel cables will be fixed to pillars at distances of about 800 yards, and in each tube a little railway will run with cars capable of carrying 450 pounds in weight. No parcel of greater weight that this will be taken, and the cost is estimated at the modest figure of £1,000,000."—*Iron.*

RUINS IN THE CHIAPAS DISTRICT, MEXICO.—An interesting antiquity has recently been discovered at Palenque, in the Chiapas district of Mexico. The monument is situated upon the River Xkupa. Although it is now a complete ruin, it was originally a structure of considerable height; as three distinct stories are still distinguishable. The ground floor is very large, measuring some 120 feet by 75 feet. The floor above is attained through holes in the ceiling or vault, and here a room is found measuring some 27 feet by 9 feet. The openings referred to are natural and have been formed by the disintegration of the stone and the sinking in of the roof. On stone slabs set into the wall are bas-reliefs of human figures, warriors, etc. Although these stones are in a very bad state of preservation they are to be sent to the capital of Chiapas. Near this ruin are a row of houses forming a street, and not far from these the vestiges of quite a large town, all of course in a state of complete ruin.—*Scientific American.*

PREPARING FOR A SETTLING OF THE EIFFEL TOWER.—During the last forty-eight hours the great question for Parisians has been whether M. Eiffel's tower, now some two hundred and fifty metres high, is in danger of falling. Within the last few days many people, chiefly those living in the neighborhood of the Champ de Mars, have been examining the huge iron structure, and, after looking at it with pinnule-lines held between it and their eyes, have come to the conclusion that it does not stand straight. The result has been that all Paris went to look at the tower to-day. In the afternoon the Trocadéro, the quays, and the bridge were constantly crowded with spectators contemplating the structure. The question had on Saturday caused such a commotion in the vicinity of the Champ de Mars that it became necessary to have the condition of the edifice officially vouched for. The engineers of the exhibition works consequently met those of M. Eiffel, and proceeded with great care to examine the structure with their theodolites from every point of view. Their verdict was that the structure leaned neither to the right nor to the left, but stood perfectly straight. This is reassuring information for those who live near the Champ de Mars, but I doubt whether the simultaneous announcement, "Precautions have been taken to put the tower straight, if ever it does show an inclination to lean over," is equally so. It appears that, in view of the possibility of such an occurrence, a complicated system of machines has been placed at the base of the edifice, designed to put it straight if ever it should deviate from the perpendicular. This mechanism, which is hidden in the brickwork, will, it is stated, if ever required, be put in motion by a hydraulic press of 800 tons power. By its aid it will be easy to remove one or more of the thin plates of steel now resting between the brick foundations of each of the four feet of the tower and the iron girders, and thus right the giant edifice speedily.—*London Standard Paris Correspondence, January 8.*

FELLING TREES BY ELECTRICITY.—Hitherto machines for felling trees have been driven by steam power, but this is sometimes inconvenient, especially in thick woods, and electric power has recently been adopted in the Gallician forests. Usually in such machines the trunk is sawed, but in this case it is drilled. When the wood is of a soft nature the drill has a sweeping motion and cuts into the trunk by means of cutting edges on its sides. The drill is actuated by an electric motor mounted on a carriage, which is brought up close to the tree and shackled to it. The motor is capable of turning round its vertical axis; and the drill is geared to it in such a manner that it can turn through an arc of a circle and make a sweeping cut into the trunk. The first cut made, the drill is advanced a few inches and another section of the wood removed in the same way until the trunk is half severed. It is then clamped to keep the cut from closing, and the operation continued until it would be unsafe to go on. The remainder is finished by a hand-saw or an axe. The current is conveyed to the motor by insulated leads brought through the forest from a generator placed in some convenient site.—*London Times.*

A GERMAN WHITEWASH.—A German paper publishes a formula for a wash which can be applied to lime walls and afterwards becomes waterproof so as to bear washing. Resenschuk, of Munich, mixes together the powder from three parts siliceous rock (quartz), three parts

broken marble and sandstone, also two parts of burned porcelain clay, with two parts freshly-slaked lime, still warm. In this way a wash is made which forms a silicate if often wetted, and becomes after a time almost like stone. The four constituents mixed together give the ground color, to which any pigment that can be used with lime is added. It is applied quite thickly to the wall or other surface, let dry one day, and the next day frequently covered with water, which makes it waterproof. This wash can be cleansed with water without losing any of its color; on the contrary, each time it gets harder, so that it can even be brushed, while its porosity makes it look soft. The wash or calcimine can be used for ordinary purposes, as well as for the finest painting. A so-called fresco surface can be prepared with it in the dry way.—*Invention.*

Women Iron-Workers.—There are probably a thousand women working in the iron-mills in Pittsburgh, making bolts, nuts, hinges and barbed-wires. Three years ago, owing to a difficulty with the men working in the bolt-mills, the proprietors decided to try women, and since that time they have been employed very generally in all the iron-works. Women are also employed in Pratt & Letchworth's malleable-iron works at Black Rock, N. Y. Four years ago the proprietors engaged two young women to do office-work. That they employ ten women in that department to-day is proof of the success of this movement. The firm employ in all about 150 women in the different departments. The work there is all piecework, and the young women earn about $6 per week. The more expert earn more. They do work that is usually done by boys, but one of the proprietors says: "We find the girls more attentive to business and more faithful; they are nearly all under twenty years of age, and it is our experience that girls of fourteen know more than boys of the same class at eighteen." "When they get through their work they wash every suspicion of dirt from faces and hands, change their shoes and gowns and smooth their hair. Then they don comfortable and becoming wraps and hats and sally forth. No one, from their appearance, could guess that they had not been handling ribbons and laces all day over a dry-goods counter instead of operating oily and face-blacking machinery."—*Springfield Republican.*

Portland, Conn., Sandstone.—Some of the brownstone quarrymen to the east of this city have been agitated by a report that the supply of the famous Portland sandstone or freestone on the Connecticut River, opposite Middletown, was limited, and that for this reason New York builders were getting into the habit of using pressed-brick in its stead. Investigation shows the rumor to be totally without foundation. None of the quarrymen can tell where it sprung from, but it is probably a revival of a similar story which it appears has floated about the Connecticut Valley with greater or less regularity ever since the Portland quarries were opened. The remarkable deposit of sandstone at Portland covers an area of over 200 acres, and is practically inexhaustible. It lies in horizontal strata, usually with each stratum in the upper levels varying a trifle from the others in the fineness of the sand. In one of the three large quarries now worked several acres have been quarried to a depth 200 feet below the surface, and as an experiment some time ago to decide the probable depth of the sandstone, a diamond drill was started down from the bottom of the 200-foot level. It was driven down 312 feet without reaching the bottom of the deposit, making 512 feet in all. The core that was taken out showed no material change in the character or quality of the stone. Illustrative of the recent rumor is is remembered that in 1715 the Middletown people became frightened because of the extensive quarrying of the stone that was being carried on and passed a law prohibiting people from quarrying the stone for transportation out of the town.—*New York Times.*

Pit Props.—In the Landes district of western France, on the Gironde, the soil is sandy and will grow little but pines, of which forests have been successfully cultivated. The inhabitants subsist almost exclusively upon the revenues derived from the production of pit-props, railway-ties, telegraph-poles, fuel and resin. The annual shipments of pit props from Bordeaux to England now amount to about 175,000 tons, which is twice as much as was shipped ten years ago. The ties and poles are used mainly in France. A large quantity of young pines are also shipped to England for manufacture into paper. The poorer classes, especially those farthest from transportation facilities, give their attention to resin, but there is said to have been a serious decline in the exportation of that article from Bordeaux through competition from the United States, which has greatly increased its exports, and is the chief source of supply. This has been a serious misfortune to the inhabitants of the Landes district. Pine oil is made from the refuse of resin left in making turpentine. It is used extensively in Bordeaux as an illuminating oil. It burns brightly, is cheaper than petroleum and is non-explosive. It is also prepared and sold to some extent in this country, patents having recently been taken out for its production. In France the pine does not appear to suffer from the extraction of resin, where care is used, but on account of it the wood is said to be better fitted for certain purposes, such as the manufacture of paper and pyroligneous acids. The Landes forests are all of comparatively recent origin.—*Northwestern Lumberman.*

Steel-Girders.—The substitution of steel for iron in girder manufacture appears to be making steady progress. The *Moniteur des Interêts Materiels* states that for the large new warehouses in course of erection at Buenos Ayres steel-girders are specified, and that, as these cannot be advantageously obtained in Belgium, the contractors, Hulot & Company, Louvain, have had to place the order with the Rothe Erde Works, in Germany, a concern which makes a specialty of this kind of work. As the order is for 5,000 tons, the Belgian iron-girder rollers are asking themselves to what extent steel-girders are likely to replace iron in the future, and how far their present practical monopoly of the export business in large rolled-girders is threatened by this preference for steel. The *Moniteur* draws comfort from the reflection that while for the nine months ending September 30, the export of steel from Belgium was only 80,000 tons, the shipments of manufactured iron reached 210,000 tons.—*Iron Trade Review.*

TRADE SURVEYS

Among the notable incidents of the past week in trade and manufacturing circles are the notice of a 5 to 12 per cent reduction in wages among the iron-workers of Eastern Pennsylvania; the further progress of negotiations among Northwestern railroad presidents for the establishment of freight schedules; the organization of companies for manufacturing South of the Ohio River, capitalized at twenty million dollars; the strengthening of Southern lumber associations in view of an increasing demand for Southern mill products in the North; an increase of 4 1-2 per cent in railroad gross earnings of given roads during January; improving export trade prospects and an enlarging domestic distribution of mill, shop and factory productions; more rails and railway material have been put under contract this year than last. The copper syndicate is forced to recognize the fact that there will be a probable surplus of one hundred and fifty million pounds of copper in the United States this year to take care of, besides increases in other quarters of the world, which were not fully taken into account when the combination was formed. Lumber manufacturers in Virginia, representing 800,000,000 feet per annum, held a convention at Norfolk, Va., recently, to form a protective association in the interest of higher prices. The Georgia Railway Commission is endeavoring to secure evidence that the recently formed yellow-pine combination in that State is illegal. The white-pine manufacturers of the Northwest are advised by very excellent authority not to run their mills to full capacity on account of the large supply of yellow-pine coming into that section. The recent auction sale of fifteen million feet of hemlock at Williamsport, Pa., shows an advance in one year of 50 cents to $1 per thousand. The Southern shingle manufacturers meet in New Orleans, March 7, to restrict production and mark up prices. The most significant feature in the lumber trade is the wonderful development of Southern Territory and the inroads that Southern lumber is making throughout the North from the coast to the Rocky Mountains.

North Carolina mountaineers are establishing offices in Chicago for the distribution of their products throughout the Northwest. Oregon fir and cedar and California redwood is crowding East. Architects are using a greater variety of woods, and builders are experimenting with substitutes for products heretofore used, all of which is stimulating demand for newer kinds of wood in all channels of trade. Trade indications are that lumber will rule low all this season, a fact which is proven by the hand-to-mouth policy of wholesalers and retailers. The downward tendency in prices growing out of increasing manufacturing and transportation facilities is offset partly by the growth of the spirit of and necessity for trade combinations. The Southwestern yellow-pine manufacturers met at Texarkana, Mo., on Thursday of last week, and took steps to control production in the direction of higher prices. Lumber magnates in Wisconsin are preparing to build a long line of road to connect with the Union and the Canadian Pacific roads, by which the Northwestern lumber interest, or a considerable percentage of it, can have a new trans-continental line, independent of the roads which now control the lumber traffic of that section. Business in lumber in the aggregate all over the country has been larger since January 1, than for same time last year. The general expression of opinion privately among the builders at their National Convention in Philadelphia, last week, was that it was probable more building would be done this year than last. Building enterprise is showing out well throughout the New England States. At New York, 250 buildings were projected in January, which, it is estimated, will cost $2,000,000 more than the projected work of January last year. A corresponding improvement is apparent at Philadelphia. No discouraging reports are heard from farther Western cities. The successful adjustment of railroad questions in the Northwest will strengthen confidence in more than railroad circles, but nothing less than a material expansion in traffic will bring permanent peace to the warring railroad interests. Railroad earnings on one hundred and eleven roads for the first month of the year exhibit an increase of nearly four-and-one-half per cent in gross earnings over same month last year. Last year, imports increased two per cent, and exports declined three-and-one-fourth per cent. But little iron and steel are arriving, and American makers are prudently restricting output to actual requirements. Brick-makers are making active preparations wherever weather permits for an enlargement of output, particularly in the interior, where new industries are springing up.

The brick-machinery makers have no less work on hand than they have had for months, and in some Western works the orders on hand will engage the capacity to June 1st. Brick is entering much more generally into construction of new houses and works than a few years ago. A better class of work is apparent. Most of the works constructed are larger, have more capital behind them and their owners are looking further ahead, than when the industries were struggling for existence. One authority estimates that over one hundred large brick works are projected at this time. Since last September two hundred saw and planing mills have been begun or projected in the country so far as records show. On March 1st, the present restriction among sash, door and blind manufacturers in the West terminates and each manufacturer can then produce as suit himself. The manufacturers of building materials and house and mill supplies have looked very carefully into trade conditions and prospects and they feel that as much money will be expended in these channels as last year. Wall-paper makers have sold the bulk of their stock. Carpet makers are speeding up, cotton-goods manufacturers, North and South, are quite busy though late reports show that average dividends run only from six to eight per cent. This fact does not seem to check cotton-mill building enterprise, for since January 1st, one half more has been projected than for the first two months last year, so far as reports of projections show. The improving conditions are not universal, however. There are weak spots here and there, little or no profits, enlarging obligations and so on; but sizing up all interests the country is gaining in strength and activity, and confidence in future prosperity is general. Yet the bottom fact must never be lost sight of, that the country's financial system is slipping away and no sufficient substitute has been suggested. The most abundant prosperity and superhuman energy cannot stand up against a weak financial system. Political parties have not a word to say on this topic and business men are too busy making dollars. Yet the necessity for a new system is growing apace and in time the leaders in the nation's enterprises will come to recognize that some preparation must be made for the change that is rendered imperative by the gradual extinction of the public debt.

S. J. Parkhill & Co., Printers, Boston.

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HOUSE OF MRS. ELDRIDGE, OCHRE POINT, NEWPORT, R. I.

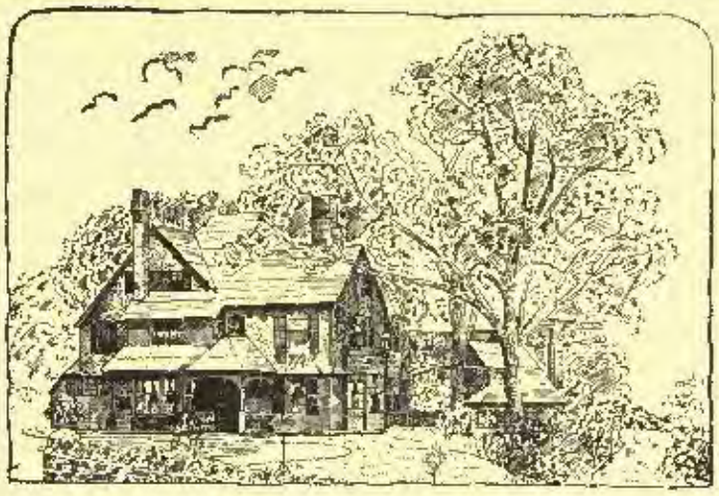
DUDLEY NEWTON Architect.

HELIOTYPE PRINTING CO., BOSTON

The exterior of this house is stained with

GABOT'S CREOSOTE STAIN

for Shingles, Fences, Clapboards Etc



These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply.

Our Stains contain no water and are the only exterior Stains that do not contain kerosene.

PRICES are 40, 60 and 75 cents per Gallon According to Color.

SEND for Samples on Wood, and Circulars.

SAMUEL CABOT

70 KILBY ST. BOSTON, MASS.

FLEMISH TOWERS.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 80. SATURDAY, FEBRUARY 2, 1889. VOLUME XXV. No. 181.

THE GEARED HOIST MACHINE.

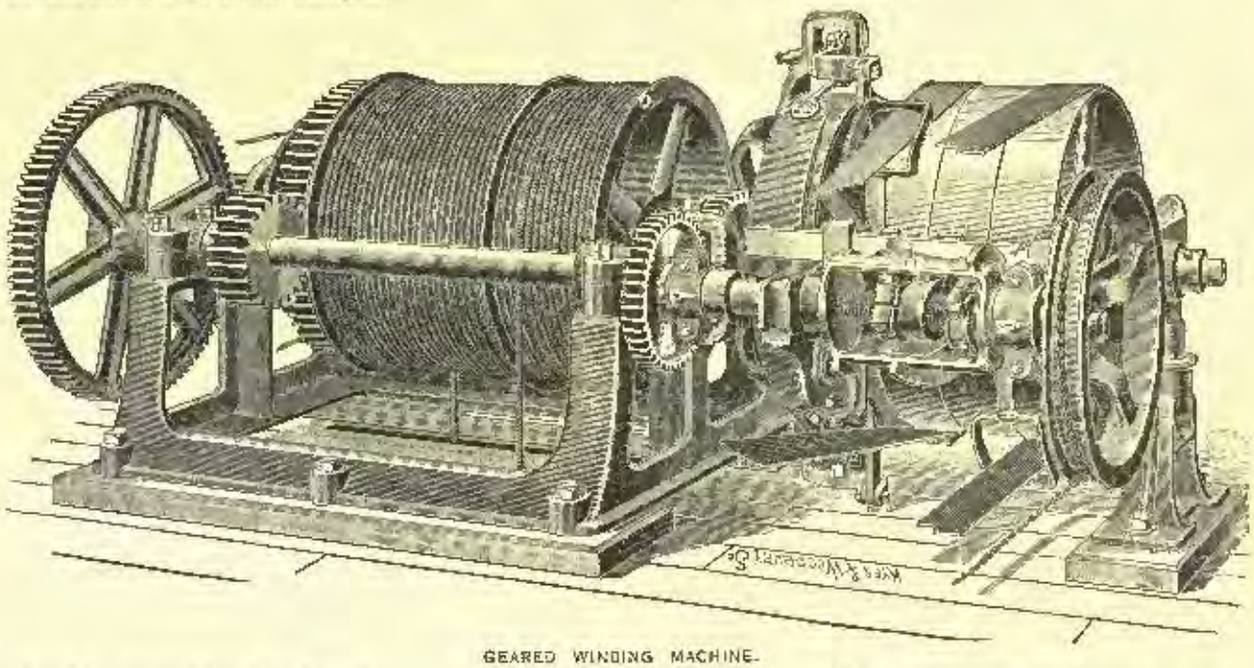
The Geared Hoist for passenger or freight elevator service as shown, has several new features; both pinion and gears are cut by the most approved methods, securing greater accuracy than has been attempted heretofore in the same class of machinery, and giving a smooth and noiseless motion at a high speed. It is provided with a Centrifugal Governor that acts in case the belts break in descending; has Slack Cable Device that stops the car instantly and applies the brake, keeping the cables taut on the drum when the car is obstructed in its descent. It is also provided with Automatic Drop Forge, Wrought-iron Stop Device, which absolutely prevents breakage. The machine is right or left hand and can be placed in any position desired as the belts will run at any angle. The pulleys are self-oiling, requiring attention only once in six months. It is manufactured by Morse, Williams & Co., Philadelphia, New York and Boston, who also manufacture Hydraulic, Worm Geared and Hand-Power Elevators.

MORSE, WILLIAMS & CO.,
PHILADELPHIA, PA.

A LARGE EAGLE.

The tower of the new City-Hall at Fall River, Mass., is to be surmounted with an immense eagle, nine feet in height with proportionate outstretched wings made of sheet copper artistically hammered into shape and very strongly made from a design furnished by William R. Walker & Son, architects, and manufactured by Thomas W. Jones at 172 Front Street, New York. It is the largest eagle ever made for such a purpose and will be a permanent ornament to the building. Mr. Jones's tower ornaments, weather vanes, finials, etc., made from all sorts of curious and unique designs of architects are to be seen from one end of the country to the other, as he uses only copper or brass — which though more expensive than other metals, is far more durable — and gilds only with pure gold leaf. Some work is still defying the elements after twenty-five years of use.

THOMAS W. JONES,
NEW YORK, N. Y.



GEARED WINDING MACHINE.

PORTLAND CEMENT.

The subject of Portland Cement is one of increasing importance, and each year finds the amount imported larger than the preceding year. When this article was first introduced into America, it was almost exclusively English in its manufacture. For some years, this held the preference, but the German manufacturers were steadily improving, and they forced their way to the front until at the present time the German Portland Cements are acknowledged by experts and the principal artificial-stone manufacturers to be the best on the market.

This is especially true in regard to the cements from Stettin which have always been noted for their quality. The Stettin ("Anchor" brand) Portland Cement, as its names implies, is made near the city of Stettin. It has been in use in the United States since the middle of 1885, and since that time has met with great favor.

It possesses the following merits:

1. It is always uniform.
2. It is very finely ground.
3. It is of a good color.
4. The packages are large and of full weight.
5. The barrels are lined with thick asphalt paper.
6. It is cheap, because it will do more work than most other brands, as it will carry more sand.
7. It never fails to give satisfaction.

Last year between 10,000 and 15,000 barrels of this cement were used in St. Augustine, Fla., in the construction of the large hotels and the restoration of the old Spanish Cathedral, etc.

A recent test by the Dock Department of New York, gives the following results:

Fineness. 98½ per cent through a 2,500 mesh sieve.

(The Dock Department only require 90 per cent.)

Tensile Strength. Mixed neat and broken in seven days — 467 pounds per square inch.

(The Dock Department only requires 300 pounds.)

Mixed, one part cement, two parts sand,

and broken in seven days—240 pounds per square inch.

(The Dock Department only require 125 pounds.)

Capt. W. W. Maclay, the engineer in charge of the Testing-Department of the Dock Department of this city, says:

"This cement is very finely ground and the tensile strength both neat and gauged with two parts standard sand at the end of seven days is high.

"The test is therefore a very satisfactory one, as the cement is very finely ground and perfectly reliable."

He also made a twenty-eight day test with the following result:

Tensile Strength. Mixed neat, 375 pounds per square inch.

Mixed, one part cement, two parts sand, 274 pounds per square inch.

Of this he says:

"The twenty-eight day test confirms the good opinion I gave about this cement, based upon the result of the seven day test.

"The tensile strength is very high both with sand and gauged neat, and taken in connection with the fineness and general satisfactory working, places this cement in the rank of the best Portland Cements in this market."

Do not fail to send for my pamphlet on Portland Cement.

For prices either for immediate delivery or "to arrive" write to

ERSKINE W. FISHER,
Wells Building, 15 Broadway, New York, N. Y.

These centres are all finished before leaving the factory, and painted a lustreless white, to correspond with plaster-finish of ceiling, and are priced in this way. They can, however, be painted and ornamented to suit the taste of purchasers, and to correspond with style and decoration of room where used. These centres are simply screwed to the ceiling after plastering is put on, and can at any time be

taken down, cleaned, and replaced without damage to the ceiling or centre-piece.

We present, also, a few designs of sheet-metal interior cornices and ceilings, which we will be pleased to price on application, and which will be found far cheaper than work of corresponding style in any other material. Another, and probably the chief advantage of this class of work is its extreme light weight as compared with stucco, and the fact that it will not crack or fall off, and is not injured by water.

Correspondence solicited. Always state whether work is to be sent by express or freight.

BAKEWELL & MULLINS,
Salem, O.

Hartman Steel Company, Limited, by J. G. A. Leishman, Chairman.

Carnegie, Phipps & Co., Limited, by Wm. L. Abbott, Chairman.

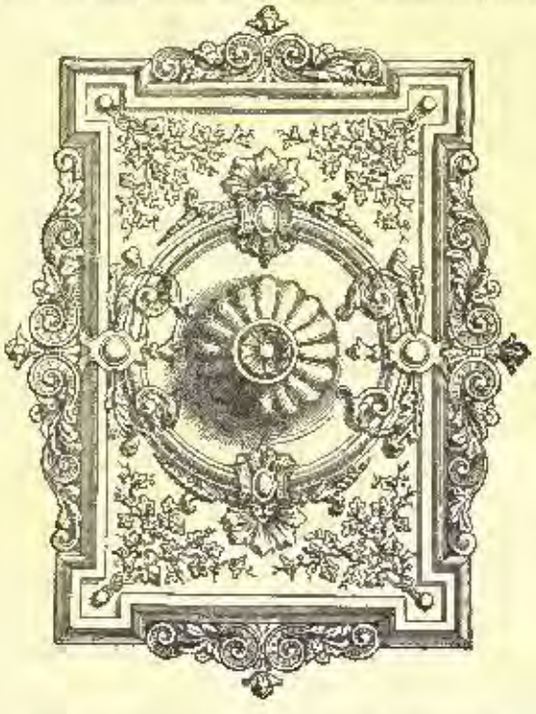
CALENDARS.

The makers of calendars, and those who use for an advertising placard those useful aids of daily commercial life as a species of side issue, seem to be divided between several classes. With every class the real object is the same—to impress on the memory of the beholder that So-and-So deals in such and such goods, at such an address.

One class seeks to achieve this end by the pyrotechnic method, attempting to make a single but lasting impression, following the methods of the theatre placard-maker in size, much color and audacious movement. This class is not nowadays a very large one.

With all the other classes there is a common leading idea—to secure the preservation of the calendar, or rather the advertisement, as long as possible, and the methods employed are various. With one class the inducement is to make the advertisement wholly subordinate to the calendar, and to make the calendar itself as useful as possible as to convenience of size, method of arrangement and legibility. The best specimen of this class that has come to us this year is the calendar issued by the Boston Lead Manufacturing Company.

The principle that guides the issue of another class of calendars is to make the article as intrinsically artistic as possible, so that it shall be kept for this quality alone. Here the calendar is subordinated entirely to the decorative treatment, and the advertisement is skilfully worked in with it on the face of the picture, or is relegated to the back of the sheet. The most attractive calendar of this type that has come to us this year is that issued by the Smith & Anthony Stove Company, of Boston, a calendar similar to the one issued by them last year. Two out of the six leaflets, in chromo-lithograph, are extremely satisfactory in treatment, and the others are on a par with other good commercial color-work. Another establishment, the Taunton Iron Works Company, of Boston, issue a similar calendar, smaller in size, with half the number of leaflets and more sketchy in the treatment of the decoration; but, still the



SHEET-METAL AS INTERIOR DECORATION AND FINISH.

Sheet-metal work for ceiling decoration and finish has long been used in Europe, while in this country it has only recently been introduced, and it is, therefore, comparatively little known. As used for ceiling centre-pieces, it possesses great advantages over the heavier and more expensive stucco and cast work, which will at once recommend it to those in want of ornamentation of this character.

The principal advantage claimed for sheet-metal centre-pieces is the extremely low price at which they can be sold, beauty of finish, durability, lightness, the ease with which they can be put up, and the fact that they may be shipped without danger of breakage.

COALITION.

Pittsburgh, Pa., January 1, 1889.

The business of the Hartman Steel Works, at Beaver Falls, heretofore conducted by the Hartman Steel Company, Limited, has been transferred to Carnegie, Phipps & Co., Limited, by whom it will hereafter be controlled.

The works will hereafter be known as the Beaver Falls Mills, operated by Carnegie, Phipps & Co., Limited.

effect is good, and if some of the colors were not a little overbright would be very dainty.

The Magee Furnace Company, of Boston, follow a somewhat similar course, though here the decoration, the monthly calendar and the advertisement of the issuing firm have about equal prominence, and the decorations are steel-engravings and not colored prints.

With another class the advertisement is intended to be the thing of importance, and the advertisers send them out as they would send out similar placards at any other season of the year; the calendar attachment seems to be added as an after-thought, as sort of apology and concession to New Year's Day prejudices. At the head of this class, since the calendar is quite inconspicuous, we should place the expensive card issued by Messrs. Samuel H. French & Company, of Philadelphia, and in the same category the even more expensive one issued by Messrs. Merchant & Company of the same city, which, taking all things into consideration, is the most successful advertising placard we have received, though it is not the best calendar. The Gurney Hot-Water Heater Company, who come in the same class, are more successful in some ways than either of the two firms just mentioned; their calendar is for wall service, and the figures are large enough to be read a dozen feet away, while the tone of colors used and the style of letters and decoration makes one quite ready to keep it during the year.

The calendars issued by the Abram Cox Stove Company and of the Thurn Shingle & Ornament Company might almost be included in the class first mentioned — the pyrotechnic class, but they both have enough good points to warrant their being kept.

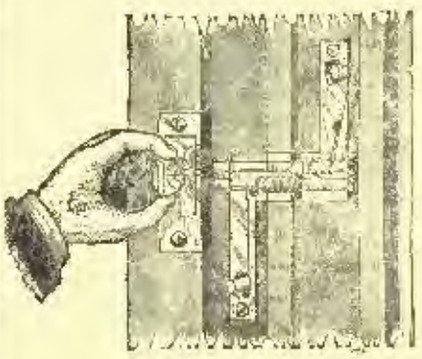
The ready-made calendar has come to be a regular visitor everywhere in a multitude of forms. It is less expensive, of course, to select a pattern from a stock of ready-made designs for backgrounds and use that rather than have one specially prepared, and it is about as satisfactory, for the multitude of these ready-made backgrounds is so great that one person is unlikely to receive calendars of the same design from two or more different advertisers. In this class we should place, at a guess, the calendars sent us by the B. C. Bibb Stove Company, of Baltimore; Messrs. Burditt & Williams, of Boston; the Lawrence Cement Company, of New York; Messrs. McKenney & Waterbury, of Boston, and Kaeler & Company, of the same city. The backgrounds used by the last three mentioned being excellent specimens of steel-engraving done by the firm of J. A. Lowell & Company, of Boston.

The conclusions we draw from comparing the samples we have received — less than in former years — is that advertisers do not often enough try to put themselves in the position of the recipient. Of the many calendars that may come to a given person, he will probably keep two for use, one for the wall with figures large enough to be read from across the room, good in design of decoration and, above all, not glaring of color; the second will be kept for desk use, and must have all the attributes of the other, and be, moreover, of such size, shape and form as not to be too much in the way. All others will be thrown away in the course of a few days, and all the excess of money spent in their manufacture, over and above the cost of a single plain circular, is absolutely lost, and worse than lost, it is misspent, since by being paid for advertising in magazines, journals and newspapers, it would have assured the spender those benefits of constant iteration which is the essence of advertising.

IMPORTANT TO HOUSE-OWNERS.

Among the almost innumerable inventions of modern times, there is no subject that has so engrossed the mind of the American inventor as the subject of window-fastenings; and though hundreds of patents have been issued in this line to as many inventors during the last decade, a comparatively small number of these inventions, when reduced to practice, have met with anything like general approval. There is probably no article in the line of builders' hardware upon the market with so great a variety to select from, and none that meets with such universal disapproval, as the article known as "Contra" sash-fasteners, for the reason that, when applied, they afford neither protection nor convenience, and such a thing as security and ventilation at same time was never dreamed of.

Within the past few months, however, a new and unique device has been placed upon the market, known as the "Timby" burglar-proof sash-lock and ventilator. This mechanical device is quite novel, if compared to, or rather, contrasted with, the old style of window-fastenings. It is so simple in construction that the casual observer must wonder



that some mechanical genius did not long ago discover and apply it.

Even such as are but superficially posted in mechanism can comprehend the workings of this lock, and the most obtuse can acquire the art of manipulating it in one easy lesson. The very simplicity of its construction, the readiness of its adaptability to any window, and the ease with which it is operated, are features so apparent that to be immediately approved it needs only to be seen. One lock only is required for a window. It locks one sash or both sashes at the pleasure of the one controlling the thumb-nut, or operating device, securing them in any desired position whether the windows are perfectly closed, or are adjusted for purposes of ventilation. It is a means of absolute security against burglars and thieves, who, if their tracks are evidence, seldom, if ever, find difficulty in overcoming the protecting qualities of the old-fashioned samples of hardware attached to the meeting-rails of the sash, while the absence of complex mechanism in the construction of this lock is apparent.

The effective purposes for which it is designed, strength and durability, are assured in the superior quality of the material used in all component parts, which are of the very best malleable-iron, steel, brass, and bronze metal.

The device automatically secures the sashes, and the lock itself is applied in such a manner as to be proof against the possibility of yielding to any tampering by thieves or others from without. It would seem to commend itself to parents and others having small children under their charge, beyond whose control the opening or closing of windows may be desirable. In every direction claimed for it, it may safely be said that it is a perfect safeguard.

"Every man's house is his castle" is one of the best known maxims of the old English common law. As light and transparent and fragile as is the glass of the castle-windows, it seems strange that it is not the vulnerable part of the structure. It appears to serve as a wall as well as the brick and stone, and, if the sashes are securely locked, the window partakes of all the presumed invulnerability of a barred and bolted door. The accompanying illustration shows a section of window-frame with the lock applied. The thumb-nut is moved upward, releasing the upper sash, the nut being semi-transparent, to show the inner construction of the lock, actuating-spring, etc.

The bolts are made from the best malleable-iron, the case from wrought-steel, the face-plate and thumb-nuts from brass and bronze metal highly polished and lacquered, presenting a very handsome appearance when applied. Varying thickness of sash or inside strips does not in the least interfere with its application. It is equally well adapted to windows having sash adjusted with or without weights or balances, and does not obstruct the attachment of weather-strips or inside-blinds. The descriptive circular of the manufacturer gives full and explicit directions for applying and operating, and a diagram or pattern accompanying each lock, so that no difficulty will be experienced in attaching them to buildings already constructed. We quote from our contemporary, the *Manufacturer and Builder*, published in New York City: "There seems to be nothing about the construction or operation of this device to render it liable to become deranged; it should be very durable, and must form a very desirable and substantial lock, affording much greater security and convenience than the centre-sash devices in common use. It seems to have much merit, and we commend it to our readers."

Letters patent of the United States were issued to the inventor, Mr. T. F. Timby, under date of March 29, 1887. Preparations for the manufacture of them were begun soon thereafter, and from the first day they were placed upon the market they met with deserved approval. The reputation gained at first remains with the lock, and as time rolls on, and its merits become more widely known, it must meet with that measure of practical application to its intended use as to defy all competition in the line of devices for window-sash fastenings.

At the fifty-seventh exhibition of the American Institute, held in the city of New York in the fall of 1888, this improved window-fastening was exhibited, and met with unqualified approval of thousands of persons who examined it, among whom were many leading architects and builders.

Besides the favorable comment of the public generally, and architects and practical house-builders particularly, more tangible approval followed in the form of numerous orders for the goods. We also see by the published lists of awards made by the American Institute for the year 1888, that the "Timby" burglar-proof sash lock and ventilator received the first prize over all competi-

tors, the award being the beautiful bronze medal of *excellence*.

This firm is also engaged in the manufacture of another new lock designed expressly for use in windows having a single sash. This lock combines all the desirable features of the double-sash lock, viz., automatic action, adjustability, ventilating qualities, etc., but is constructed much heavier in all its parts, adapting it to the heaviest sash used in the more modern styles of expensive blocks and dwellings. Special attention will be given to furnishing these goods in any style and finish to order, or upon specifications to match other trimmings used upon blocks, dwellings, or public buildings.

Many of the leading architects of the cities of New York, Boston, Philadelphia, Washington, Pittsburgh, Cincinnati, Chicago, St. Paul, Minneapolis, Kansas City, and other points have examined and approved this lock. Agencies will be established, and the goods placed on sale in all the principal cities. Dealers in first-class builders' hardware not already supplied will be visited at an early date. The locks are graded in price, according to the quality and finish, and are numbered from 1 to 5, the difference in the several grades being apparent only in the style and finish of the face-plates and thumb-nuts, which are made in polished brass, nickel-plate, real bronze highly polished, oxidized-silver, etc.; also a special A A of rich gold metal, plain or figured pattern, very fine, with buyer's monogram engraved upon the face of the thumb-nut, to order. The inventor of this lock is Mr. T. F. Timby, of Brooklyn, N. Y., who has charge of the New York office. The factory is located at Oswego, N. Y. An office has recently been opened in the city of New York in the Aldrich Building, No. 102 Chambers Street, Room 8, where models exemplifying the practical workings of the lock may be inspected. There, also, the several parts of the device and samples of the finished locks can be seen, and all desired information will be given.

Samples mounted on a section of window-frame will be distributed to architects and builders throughout the city and vicinity, and will be forwarded to any part of the country upon application. Special attention will be given to export orders, as also to the manufacture of special designs to meet the requirements of architects or others to order.

This novel device will without doubt find a ready place upon the market, as it seems to meet a want not supplied by any of the sash-lock fastenings in the market; namely, security and ventilation — at the same time covering a field heretofore left vacant, which fact will be appreciated by house-owners.

JENKINS & TIMBY,
OSWEGO, N. Y.

THE S-TRAP AND THE McCLELLAN TRAP VENT.

In my contribution to the subject of trap seal protection, I called attention to the fact that Mr. Putnam's experiments demonstrated that an unused *vented* S-trap would lose its seal by evaporation in less than two weeks, and that an *unvented* S-trap unused would retain its seal for many months. Since all disinterested parties agree that the S-trap, with fair usage, will rarely or never foul, and that traps of all other forms *do* foul *in proportion to their departure from a uniform calibre*, the conclusion is inevitable that, if its seal can be preserved against siphonage and evaporation the S-trap is incomparably better than any other.

Your correspondent asserts that "no automatic air supply has ever been invented, nor probably ever will be, which will form a reliable protection against siphonage;" but admits that such form of air supply seems to him "*to be much more reliable in many ways than the ordinary back-vent pipe.*" (The italics are mine.)

The many tests made of the automatic vent[1] referred to by me in my former communication — in this city, under the direction of Dr. William K. Newton, Health Inspector, at the rooms of the New York Master Plumbers' Association, at the New York Trade-Schools, etc., fully established its reliability in preventing siphonage. Mr. Edward Murphy, Secretary of the New York Plumbers' Association of New York, says: "I am free to say that it fulfilled every claim made for it, notwithstanding the tests were made more severe, as regards siphoning, than are ever found in actual practice." In addition to this, I understand that, after careful testing by its experts, the New York Board of Health has repeatedly approved plans calling for its use to the exclusion of back-vent pipes.

The question as to the cost and complication is sufficiently answered by Mr. Murphy's further remark that "its advantage in reducing the cost of plumbing, in furnishing an adequate supply of fresh air, and its non-liability to get out of order are so patent that further comment would be useless."

My statement that "all so-called anti-siphon traps acquire their non-siphoning quality at the cost of cleanliness," and "have greatly enlarged cavities which gradually fill up with decomposing filth," is met by the assertion that "there are no '*greatly enlarged cavities*' in a scientifically designed anti-siphon trap."

My remarks were not directed against any special form of trap, but against an *unscientific method* of preventing loss of seal by siphonage. It is well-known to every competent expert that no unvented trap has ever been made that will maintain its seal against strong siphonic action unless its up-cast limb is greatly enlarged, and hence that any trap of uniform calibre must be provided with an air supply at or near its crown to prevent siphonage.

More certainly a one-and-one-half inch trap, with a cylindrical chamber of some three inches in diameter, and nearly five inches long, forming a part of its up-cast limb is no exception to the foregoing proposition. Nor do I think such a cavity with its sharp angles and extended surface will be found less likely to accumulate filth, with a given water flow, than similar enlargements in other traps.

The advantage to be gained by the use of large outlets to fixtures so as to secure the thorough scouring of the trap and waste-pipe is well-known, but shamefully neglected in practice. The statement about the filling up of an ordinary S-trap until its waterway was just large enough to carry the little stream its small-outlet fixture permitted, simply supports my position that all enlargements form convenient lodgments for filth, and that it is only a matter of time when they will so fill up as to leave a nearly uniform waterway through the trap.

The talk about back-pressure amounts to nothing, if reasonable skill is used in constructing the drainage system. If the openings of the fixtures are large enough to allow a proper flush to scour the trap and waste-pipe shreds of lint will not find lodgment in the trap, and without their presence loss of seal by capillary action will not occur.

The small quantity of water required to seal the S-trap, and the readiness with which it is scoured by a reasonable flush are not objections, but are among its greatest virtues; while the increased volume of water required to form the seal of a so-called non-siphoning trap decreases its scouring quality and tends to establish a miniature cesspool, increasing the evil, as its greater volume of water and its non-siphoning qualities increase.

The claim that in the case of a kitchen or butler's pantry sink trap grease is liable to spatter up into the mouth of the vent-pipe or vent-connection, and thus eventually close it up, is true only when the vent-connection is placed directly over the up-cast limb of the trap. This should be avoided by placing the connection *beyond the crown of the trap*, but sufficiently near to it to prevent siphonic action.

Finally, this discussion plainly points to the following conclusions, viz:

1. That the ordinary S-trap is the simplest and most cleanly ever devised.

2. That to prevent siphonage with absolute certainty, an air-supply must be provided to the waste-pipe at or near the crown of the trap sufficient to meet all demands without disturbing the seal of the trap.

3. That while back-vent pipes, when short and direct, furnish air-supply adequate to prevent siphonage, they fail in this respect when the lines are indirect or very long; besides, the air currents they maintain rapidly destroy by evaporation the seals of unused traps.

4. That the back-venting of traps to the roof is costly, complicated and dangerous.

5. That an automatic air-supply directly from the room at the point needed is the only uniformly reliable method of preventing siphonage in all situations. — *M. Hommon, in the Sanitary News.*

[1] McClellan Anti-siphon Trap-vent made by the Dubois Manufacturing Co., 245 9th Avenue, New York.

NOTES.

The Ridgerwood Manufacturing Company, New York, have just issued their new catalogue for 1889. It is a credit to this enterprising concern. The book contains fully a hundred excellently executed engravings of their superior hoisting machinery, boilers, etc., and will be forwarded to those making application.

The Whittier Machine Company have recently put into the Commonwealth Hotel, Boston, three horizontal steel boilers. They have constructed for the Fall River Bleachery, Fall River, Mass., four horizontal steel boilers, each six feet in diameter. Also, have recently put in for Mr. M. Brennan, at the corner of Eighty-fourth Street and Ninth Avenue, New York City, two hydraulic elevators for passenger service.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 688.

MARCH 2, 1889.

Entered at the Post-Office at Boston as second-class matter.

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FOR some time our agents, who are constantly brought into contact with advertisers and material-men, have reported that misstatements were being made concerning this journal by interested parties. Though disagreeable, we believed that, coming from such sources, these false impressions would be set right through the mere passage of time. But when "one of the most prominent of —— architects" ventures to make mendacious statements concerning the conduct of this journal the matter seems serious enough to notice publicly. We therefore ask attention for a letter and our answer which appear in another column.

THE matter of the ceiling in the Albany State-House does not look any nicer as time goes on. As we said the other day, any one who really wanted to find out how much the ceiling was worth need only call in some one who knew about such matters, and in half a day the true value could be ascertained, and compared with the cost to the State. Singularly enough, this has been done. After a month or so of apparent distress and perplexity, diversified with a convulsive attempt to chastise a newspaper reporter who got tired of waiting for the official investigation to discover something, a few experts were sent for, who were incautious enough to ascertain the truth in a few hours, and to report just what they ascertained. The substance of this was, that the true value of the ceiling, as erected, including a liberal allowance for risk, contingencies and profit, was not over one hundred and sixty-five thousand dollars. What has become of the difference between this sum and the two hundred and seventy thousand that the State has actually paid, or will have to pay, it was not the province of the experts to determine, and the outside public will probably never know. Every one, in or out of the New York Legislature, undoubtedly believes that the tax-payers have been robbed of a large sum, but an investigation that really investigates is too dangerous an undertaking to be attempted, and the whole matter will blow over, the New York tax-payer having long ago made up his mind that it is foreordained that he should pay a great deal for his State-houses, and get very little, just as the Boston tax-payer has resigned himself to paying twice as much for his school-houses as other people. Both of them understand well enough that their money has been used for corrupt purposes, but to ascertain who got it, and to bring him to justice, is more trouble than to go to work and earn enough to make good the amount stolen. Of course, this way of looking at the matter just suits the people who get the money, and they grow bolder every day. Some further statements of the experts throw a curious light on the carelessness, to call it by no harsher name, with which the public business in relation to buildings is carried on. According to the official accounts, Mr. Smith's bid, of two hundred and seventy thousand dollars, was the lowest one received for the work as shown by the drawings and specifications. It seems a little strange that a contract amounting to so large a sum should have been fought for with so little spirit that the lowest bidder could secure a profit of about one hundred per cent, but the superintendent acknowledged, we believe, that he did not advertise for offers, but spoke to some contractors that he knew, and invited them to come in and make a bid. This would be bad enough, but from the report of the experts it appears that out of the fifty-one drawings shown to them as those on which the contract was based, only six had been made at the time the contract was awarded, and these six were so vague that no estimate could, in their opinion, have been made upon them. Whether the other bids submitted at the same time as Mr. Smith's were, therefore, fictitious estimates, put in for the purpose of making his appear the lowest, they do not pretend to say, but they think it might be interesting to find out. Another curious discovery, which they made by the simple process of counting the panels shown on the drawings, and those in the ceiling as built, was that while the drawings showed it divided into seven hundred and sixty-four panels, the actual ceiling was divided into only three hundred and ninety-six. A saving of ten thousand dollars was made to the contractor, they think, in the item of iron-work alone, by this change, which was ordered after the contract was signed, on the sole authority, as it appears, of the Superintendent of Buildings. Another change, by which ten thousand dollars more was put into the pocket of the contractor, or some one else, was the substitution of papier-maché for carved oak in the spandrels on the walls, for which no warrant whatever existed, even in the remarkable specification on which the contract was based. What will be the next step in the process of getting out of the predicament into which this over-candid report has put the persons interested remains to be seen. We imagine, however, that it will consist in the summoning of a new board of experts, who will come to conclusions very different from those of the first board. Thus the whole matter will again be thrown into a state of hopeless chaos, from which it will sink quietly into oblivion.

THE Boston School Board is just now reflecting whether official architecture is any more economical than the article furnished by private members of the profession. It was some time ago demonstrated in Boston that the cost of drawings, specifications, contracts and supervision from the City Architect's office was more than the five per cent on the cost of the buildings which a private architect would charge; and it has now occurred to some one to compare the cost of the buildings erected under official auspices with that of similar structures built elsewhere. The public accounts show that a certain school-house recently completed in Boston cost one hundred and twenty-eight thousand dollars. A similar school-building has just been finished in a city near Boston for sixty thousand dollars, and Chicago has lately put up several of about the same pattern for less than sixty thousand. There is no pretense that the Boston school-houses are more sumptuous than those of its rival towns, and the simple inference is that under its system Boston pays about twice as much per head for accommodations for its school-children as other towns do under the ordinary system. Mr. Capen, of the School Board, expressed the opinion that the Boston method was "a scheme for spending the most money for the least work," and most persons will agree with him, but whether there is any possibility of getting it changed is another matter.

IT must be confessed that the strong point of public officials does not seem to lie in their appreciation of the wishes and needs of artists. The annual season of blushing over the confusion and misapprehension existing in Congress on the subject of works of art, as shown by its discussions on the tariff affecting them, has just begun, and seems this year to be more painful than ever. Under the old tariff, as every one knows, works of art by American artists residing abroad were admitted into this country free of duty, while those made by foreigners were charged with a heavy impost. Naturally enough, this airy generalization was soon utilized to cover a multitude of petty frauds, to the injury of all decent artists, and the discredit of the framers of the law. It is said, and, we believe, with a certain amount of truth, that some enterprising metal-dealers, after the law was passed, hired an impecunious American abroad to buy pig-lead, on which there is, or was

then, a heavy duty, melt it, and cast it in a mould, from which it issued in a rude semblance of a figure of George Washington. When the firm wished to replenish its stock of lead, it notified its "sculptor," and he soon turned out the requisite number of "statues," which were entered as "works of art by an American sculptor residing abroad," and passed through the Custom-House free of duty, much to the financial advantage of the firm. It does not seem as if a very astute mind would be required to devise a law which would not be subject to such a ridiculous abuse, but the Senate Tariff Bill, now pending, makes a bad matter worse by amending the law with a definition which says that the term "statuary" shall be understood to include "only such statuary as is cut, carved, or otherwise wrought by hand from a solid block or mass of marble, stone or alabaster, or from metal." Under this definition the importation of pig-lead Washingtons would, indeed, be cut off, but with it appears to be prohibited the free introduction of any sort of bronze or other metal statue by an American artist, unless he is prepared to swear that he has "cut, carved, or otherwise wrought it by hand," out of a solid block of the material. If, however, the "American artist residing abroad" finds himself thus unhappily prevented from sending home any of his bronze statues which he has not himself filed or whittled out of the ingot, he may perhaps gain consolation in another way. Under the proposed bill, the provisions in regard to duty are specified as applicable to "paintings, statuary, fountains and other works of art." The method prescribed by the law for making statuary does not apply to fountains, and, so far as we can see, there is nothing to prevent an ingenious American from casting lead fountains, instead of statues of the "Pater Patriæ," and sending them over here to adorn, temporarily, the back-yard of the importer, before they are consigned to the melting-pot. On the whole, the Senate Bill, which will probably form the basis of any legislation on the subject for the present, considerably increases the duty on works of art produced by foreigners, while allowing the free importation of those made by Americans; and, as the international copyright question has been decided in exactly the opposite sense, the country is apparently committed to the absurd position that the works of one kind of art, if produced by foreigners, ought to be disseminated here as rapidly and cheaply as possible, for the public benefit, and that the American producers of that kind of art ought not to ask for protection in their best market; while foreign works in another sort of art are kept out, also for the public benefit, by a high tariff, which is avowedly imposed to foster the interests of American artists of that sort, by enabling them to get a larger price for their works.

ALTHOUGH the number of public functionaries who consider that architects have no rights that anybody is bound to respect grows smaller day by day, there are a few left, even in the older countries, where the position of the profession is much more assured than it is with us. We find in the Belgian journal, *L'Emulation*, an advertisement, setting forth that the Mayor and Council of a certain town will receive plans for a hospital, or asylum of some sort, up to a certain date. In the lordly style which is so familiar here, but which seems very antiquated abroad, it goes on to say that the author of the plan adopted will be charged with the execution of the work, and will receive as compensation four per cent on the contract-price. It is, however, stipulated that the cost is not to exceed fifteen thousand dollars, complete for occupancy, with "the key in the door"; and that all expenses exceeding ten per cent beyond the contract-price shall be paid by the architect who has the direction and supervision of the work. The editor of *L'Emulation* mildly observes that this programme "seems to be not quite complete," and we imagine that the competition will be confined mainly to office-boys and students, Belgium being a place where the value of real architects' services is very well understood. To the profession there, we suppose that the clause by which the architect guarantees the cost of the building will seem the most extraordinary part of the programme. There is no doubt that it would be binding upon any one who chose to accept the terms by entering the competition, and we should not be very sorry if some indiscreet youngster, filled with the blissful confidence of being able to get an indefinitely large amount of work done for an indefinitely small amount of money, which is characteristic of youth, should bring himself and his family to financial disaster as an example of its force, for the benefit of other persons who might be tempted in the same way. It is not that we object to the principle of an architect guaranteeing the cost of the buildings he designs. On the contrary, there is no more reason for an architect's refusing to make such a contract, *if he is paid for it*, than for an insurance company refusing to insure the building against fire. What is the proper price to be paid to the architect for this guaranty, in addition to the compensation for his professional services, is the only question that need admit of a doubt. Builders usually add to their estimate ten per cent for "contingencies," and, if the architect is expected to pay for the "contingencies," ten per cent on the cost would not be too much to cover his risk. Most experienced architects, we imagine, would take the risk on their own plans, carried out under their direction, for about this percentage, and few, who had money to lose, would do it for any less. In the case of public buildings, particularly, this understanding might be an advantageous one for all parties, and we should be by no means sorry to see it often entered into. The architect would gain by the more efficient control and freedom from interference which it would give him over his work, while the tax-payers could count, if their plan and their architect had been carefully selected, on getting a satisfactory building complete within the amount of the appropriation.

AN international Congress of Architects is to take place this year in Paris, in connection with the Exhibition so far as this, that the invitation is issued in the name of the French Government, and the principal officials in charge of the Exhibition have honorary places on the Committee which will conduct the Congress. In addition to these official members, the committee includes the most distinguished French architects, besides many amateurs, artists and others. The Congress will meet on the seventeenth of June, and will continue five days. On the first day the subject of discussion will be the theoretical and practical teaching of architecture, and the instruction of workmen concerned in building operations. On the second day, mutual assistance among architects will be considered, and the matter of protective associations, and mutual insurance, or charitable societies will be taken up. The third day will be occupied with the consideration of the property of architects in their designs; and the fourth by discussions on architects' diplomas; public competitions, and their influence upon architecture; and the compensation of architects and experts. On the fifth day a visit will be made to the Castle of Chantilly, recently presented by the Duke of Orleans to the Republic of France.

THE Secretary of the National Association of Builders points out that our remarks last week upon the apparent want of preparation in the conduct of the recent convention at Philadelphia do injustice to himself and the committee in charge, and expresses the opinion that we might have remembered that we received from him at an early day the full programme of the proceedings, which showed that nothing which could promote the prompt despatch of business had been left unprovided for. It seems needless to say that, had we remembered that we had this programme at hand, it would have been used to rectify the impressions created by the reports in the daily papers.

LA CONSTRUCTION MODERNE contains a description of a banquet given by the architects of the Department of the Maritime Alps to the winner of the Prize of Rome of 1888 in architecture, M. Albert Tournaire. M. Tournaire is a native of Nice, the principal town in the Department, and about thirty gentlemen, including the Count de Malaussène, Mayor of the city, with distinguished engineers and other persons, besides the architects, assisted at the entertainment. M. Louis Convers, the winner of the Prize of Rome in sculpture, and M. Henri Leriche, the Grand Prize in engraving, who were on their way to Rome with M. Tournaire, were invited to the feast, and compliments enough were bestowed on all three to turn the heads of young men of less capacity. Fortunately for them, the conquest of the Grand Prize in any section of the School of Fine Arts is a matter of hard and long-continued work, of many disappointments, followed by renewed effort; and the courage and perseverance developed by such discipline are incompatible with a weak susceptibility to flattery. M. Tournaire's reply to the toasts drunk in his honor seems to have been modest and sensible, and the festivities probably served an excellent purpose as a mark of encouragement and appreciation such as we wish our own ambitious students might more frequently meet with.

AUGUSTE RODIN.[1]—IV.

Ugolin and his Sons.

SOON after "The Age of Brass" was completed, Rodin made preparations to return to Paris. In answer to the question as to whether he would ever have left Brussels if he had not been refused further employment, he replied: "Perhaps not. I did not know that I had any talent, though I knew I had some skill, and I never thought I was anything more than a workman. I never signed my work, and so I was not known."

On arriving at Paris in the early spring of 1877, and finding that he had no studio, he occupied for a short time part of one belonging to an acquaintance, in the Rue Bretonvilliers. As he had spent all his money in making his figure, it was again necessary for him to seek employment among the same class of men for whom he had worked before he left Paris. Strangely enough, Belleuse was the first one that he happened to meet, and who immediately offered to give him something to do. The offer was accepted, and for the third time Rodin began to finish the sketches of his old employer, but this time in his own studio and in such hours as he chose to give. For the next three years he was obliged to pass through the same kind of unpleasant experiences that had made his early life little less than miserable: he worked for various decorative sculptors, as occasion or necessity required.

One would naturally suppose that Rodin's superior skill would have been to these men a recommendation of unusual character, and that they would have seen in him a workman, at least, of no common order. Yet it was precisely the contrary. No matter how faithfully he labored, or how much art he profited for them, they were generally dissatisfied, and some of them discharged him. "Not one of these men treated me like a man," he says. A well-known and successful young sculptor, who worked in the same shop with Rodin on one of these occasions, declares that the latter "was the most learned, skilful, and rapid worker in clay that had ever been seen in Paris. There was no one like him. His things were masterpieces, but his employers were ignorant, pretentious and abusive."

Just before the great exhibition of 1878, Rodin was working for a certain decorative sculptor who was especially critical, and for whom he made a number of large heads, destined for the Trocadéro Palace, though eventually they were not used for that purpose. If they were not wholly satisfactory to the employer, he was yet quite willing to sign and exhibit them in the Industrial Art Section of the exhibition, where they gained for him a gold medal. In the same section, Rodin showed his "Broken Nose" and some other works of like merit, but received no recompense. The heads were afterwards presented by their owner to the Trocadéro Museum, and are now regarded as prized examples, some say masterpieces, of modern French decorative sculpture, though no one knows who really made them.

Rodin had occasionally the surprising good fortune, in spite of the cunning of his employers, to earn as much as twenty dollars in a day, working by the piece. But this could not last long; a workman with such a capacity would soon destroy the trade, and his astonished employer found means to prevent its repetition. He also tried his hand again with a well-known jewelry manufacturer, but with less success than before, for the latter would neither accept the sculptor's model nor pay him for his work. "Yet," says Rodin, "he thought there was something in what I did, though he could not understand it. All these men wanted what is known as 'the sculpture of the School.'"

We will now go back a year to the *Salon* of 1877, when "The Age of Brass" was on exhibition. As soon as Rodin heard that his figure was suspected of being a reproduction from a mould made over the living model, he went to an eminent sculptor who was connected with the *Salon* and asked his advice in regard to what was best to be done in order to prove that the suspicion had no foundation in fact. "Make some casts and photographs of the model you employed, bring them to the *Salon*, and we will see," was the reply. Rodin wrote to a good friend in Brussels to have them made, and at once forwarded to Paris. They arrived in a few days and were ready for examination, but this was all. No attention was paid to them. The statue, as before stated, was carried to the sculptor's studio with the ban of disgrace upon it and him.

During these two months Rodin had come in contact, for the first time in his life, with four powerful influences; namely, a friendly government official, in the person of M. Turquet, artist friends, professional antagonism, and the press. Of the effect of the first three some indication has been given, but the writer is obliged, in this preliminary and hastily written sketch, to put off for a later occasion any consideration of the expression of the last in regard to "The Age of Brass" or of the two subsequent exhibitions of the sculptor. The following paragraph, which appeared in *L'Art* for 1877 (Vol. 3, page 100), is, so far as the writer is informed, the first notice of any length that appeared in a Paris paper concerning this statue. It is from the pen of Mr. Charles Tardieu. An earlier number of the same journal contained an illustration of the figure from a drawing by the sculptor.

"'The Age of Brass,' by M. Rodin, has been very much discussed. 'Age of Brass'? M. Rodin has undertaken to symbolize the hardships of war; only he has, perhaps, neglected to give the statue an explanatory attribute that would have made its intention more clear. However, without this, the tension of the muscles, the expression of the face, the gesture of the arm, suffice to define the object of the artist, and the title would have been accepted without objection if the pretension had not arisen of discovering in this work of remarkable truthfulness traces of its having been made from a mould taken from the living model. We are convinced of the inanity of this reproach, and we can bring in favor of the loyalty of the artist the most disinterested and absolute evidence. But, without insisting on this point, one fact must be allowed, without justifying the insinuations or the jealousy expressed in his regard: the work of M. Rodin is a study, rather than a statue; a too servile portrait of a model without character or beauty; an astonishingly exact copy of a low type. But if M. Rodin appears to care so little for style, he makes it all up in the living reproduction of the life of his model. On this point his work is very interesting, and, with the addition of a few modifications, such as a little more nobility in the head, a little less thinness in the lips, it may easily rise above the criticisms now made against it."

When the *Salon* closed, a new, and the heaviest, trouble lay on Rodin's mind. It was the accusation that he was not an honest man or a workman of integrity. He had never thought of a recompense in bringing his statue to the *Salon*, but now he wanted justice. Satisfied that it was impossible for the present to get it for "The Age of Brass," he thought that the only way by which he could get it for himself was to make another statue, this time larger than life, and in the modelling of which he could not use or adapt reproductions from moulds made on the living model. He was so simple-minded that he thought that this was all he need do to convince people that he was perfectly straightforward in his production of a statue; and he never dreamed that both "The Age of Brass" and himself were revolutionary forces, disturbing conventionalism and raising up an army of perpetual foes; or that prejudice is never convinced of its errors, or such foes changed into friends. In Paris, at least, every good effort is welcomed, he thought, and he set about his newly decided task. Selecting the subject of "St. John Preaching," he began a sketch half the size of what he intended the statue to be, working on it, as had been his habit for the past twenty years, during the mornings before he went to his daily labor, and long into the nights after he had left his employer's shop.

To the *Salon* of 1878, Rodin offered, for the second time, "The Broken Nose," and under the designation of —"Portrait of M——; bust, bronze." Though it was this time accepted, it was very badly placed. The same class of appreciative observers who had discovered "The Age of Brass," also found this mask, and it served to increase interest in, and admiration for its author among his few admirers, and renewed discussion concerning his merits. The younger generation of artists, many of them students at the government school of fine arts, saw its fine qualities, and wondered more than ever about the man that made it. What kind of a man is he? they asked. No one knew Rodin, and no one saw him. One day, a number of these students were together at the school, talking, as usual, about Rodin, when some one exclaimed, "Let us all go and see him, and let him know, if we are students, that we like his things." The proposition met with enthusiastic approval and was at once carried into effect. The following account of this visit is given in the language of one of these students, who is now one of the best of the younger French sculptors: "The first work of Rodin's that I saw was his 'Age of Brass,' in the *Salon* of 1877. Among the real artists it had a great success. But the old school, many of whom had made fine things, and were still making them, were down on it to a man. We thought that it was the most life-like piece of sculpture that had been produced in French art since the 'Mercury' by Brian, and that it was really entitled to the Medal of Honor. We were wild over it. When 'The Broken Nose' was exhibited we thought that was the most extraordinary example of modelling, of its kind, that had ever been seen in Paris—worthy of the times of Donatello, and fit to be mentioned with the antique. When we went to his studio, Rue des Fourneaux, to our amazement, we found him working on the same kind of commercial art that Belleuse made by the yard, and in spite of ourselves, we involuntarily expressed our feelings in words. To which he modestly remarked, 'Yes, I am doing this for Belleuse—to get my bread.' Our pain was as great as our surprise, to see an artist who had produced such things as 'The Age of Brass' and 'The Broken Nose,' obliged to work for such a man as Belleuse; to spend his time and murder his sensibilities on the stuff he was then making. The courage he displayed in consenting to work for such an employer, excited our astonishment beyond measure. But when he showed us the body of the 'Ugolin,' we were still more surprised, and hardly knew what to say. It looked like a bit of Michael Angelo, it was so large, lifelike, and

[1] All rights reserved. Continued from page 86, No. 665.

ample in the character of its planes and modelling. We expressed our admiration for his things as well as we could and assured him of our belief in the true origin of 'The Age of Brass.' He appeared very much pleased and expressed his gratification. He then showed us some casts taken from his model and asked us to compare them with the statue. Of course, there was no similarity, the differences were as plain as day. As we so much admired 'The Broken Nose,' we asked him if he would permit us to have copies of it, to which he very willingly assented. I cannot tell you how much I prize my copy of that mask. He talked about art with an intelligence entirely new to us, and the only reference he made to himself, was this, 'I only think of outlines, to see that they are right and just.' We left him with the impression that we had seen a great and real artist, a genius; who was sure to be the most powerful demoralizer of what is called 'the sculpture of the School' that we have ever had. At this time, remember, we were all working at the School, and obliged to follow the old manner of study taught there. But Rodin, so vividly impressed us, that we took a new start, determined to look out for everything that was good, no matter where it came from or who did it. Seeing Rodin gave us new life, in fact it saved us. I always think of him with the liveliest gratitude, and rejoice in the pleasure of talking about him. Whenever any of us meet, we always say, as the first thing, 'Have you seen Rodin?' If I owe anything to any one for what little I have accomplished or am able to think in matters of art, it is to his work. Before our visit we all thought that, at least, we could make a head, but Rodin's things completely disabused us, we saw that we could do nothing. He has no end of detractors, men who ought to know better, who are determined to kill him, but he will outlive them all. He goes deeper into a subject than any living artist. Look at his 'St. John.' It is the *only* thing in the Luxembourg. He has finished that subject; it is the great note of this century. We have never had a sculptor who could interpret nature as he does. His work is profoundly just and beautiful; and as a man he is as fine as he is great as an artist. Nothing can compare with him. Happily our first impressions were correct, for many years after this visit, and after I had worked a great deal and been all over Italy, I went to see him when he was working on his 'Porte d'Enfer.' If I needed to be convinced of the correctness of my first impressions, I got it then. What a combination is the upper part! and the panels on each side! outside of their originality, they are divine, as a piece of color. It is only through men like Rodin that French sculpture can be revived. But the fact, after all, that set us to thinking for the first time on that subject, was that Rodin owes nothing to any school or professional authority. He is greater than them all, and among French sculptors, he is the only one that is worthy to be considered with Barye and Fremiet."

While Rodin was perfecting his sketch of "St. John," he made a bust of the same subject and from the same model, an Italian, about forty-two years of age, who was named Paguitelli. The bust was shown in the *Salon* of 1879, in bronze plaster. Though badly placed, the sculptor received an honorable mention. Both the bust of "St. John" and "The Broken Nose" were quite unnoticed by the newspapers.

In this same year a memorable event occurred in the art affairs of France, M. Turquet became Under Secretary of Fine Arts, M. Jules Ferry being Minister of Public Instruction. M. Turquet had not forgotten his admiration for "The Age of Brass," nor lost interest in its unknown author. His first official duty was performed by sending for Rodin to come to his office, to talk over the subject of the statue, with the ultimate intention of buying it for the State. M. Turquet had no doubt himself concerning its authenticity, but as a public functionary it was necessary for him to conform to the methods usually followed in such matters by the Government, and he requested the State Art Committee to go to Rodin's studio and examine the statue. They did so, expressed their belief that it was a veritable piece of sculpture, assured Rodin of their admiration for his talent, and reported to M. Turquet accordingly.

But in their report, they added the observation that the custom of producing statues with the assistance of casts from nature was very prevalent. Rodin learning of this supplementary addition to the report, and hearing nothing from the Secretary, believed himself lost. There really seemed no hope for him. Although he had received, for the first time in his life, warm expressions of professional regard and appreciation, and had dared to hope that fortune might yet smile upon him, yet the help he needed to put him on his feet was Government recognition, the sanction of its buying authority. He was then in deep poverty, making the most strenuous exertions to finish his statue of "St. John," and working so hard and incessantly upon it during the nights, that he was unable to reach his lodgings without assistance, after he had left his studio. It was, indeed, a time of sorrow; an overwhelming confirmation of the real name of his Brussels figure, "The Age of Sorrow."

M. Turquet was not, however, idle, nor was he shaken in his opinion about Rodin. He "firmly believed that he had discovered a great artist, deserving of every encouragement. Such an one as the State needed, whose duty it was, for its own fame, to loyally support." He, therefore, to satisfy every possible official doubt, sent to Brussels and made the strictest inquiries in regard to the model whom Rodin had employed, and the entire history of the making of the statue. At the same time he requested a number of the best-known sculptors in Paris to examine the statue. Their written report, and the result of the Brussels inquiry, satisfied all and every official requirement, and M. Turquet then bought the plaster statue of "The Age of Brass" for the State, giving the sculptor the modest sum of three hundred dollars. It was a great event for Rodin. He had now a friend at court, and such a friend as he little imagined. What mattered it if he only got a hundred dollars for his eighteen months' work, having paid two hundred to his model for posing, he had at last received the justice due him, and had come into relationship with the chief authority of his country; an authority which was eventually to make his future path free from all obstacles. The past was now lifted up, and he began to see that his own way had been true and wise.

Other experiences were also helping to fill up the years, and which were, in their own time, to bring about other gracious recognitions of his genius. Carrier Belleuse had become Art Director of the Sèvres Porcelain Manufactory, and he asked Rodin to go there and decorate vases. This he consented to do, working by a new method, called *pâte rapportée*, or modelling on the vase after it comes from the mould, and sometimes with a different kind of clay from that of which the vase is made.

Rodin's method permitted perfect freedom in working, gave full opportunity for variety of decoration and the play of the artist's imagination. The reader may safely anticipate that Rodin was sure to find, even at Sèvres his accustomed fault-finder. He first decorated two vases, with figures, and when they were taken out of the kiln, the administrator of the establishment, Lauth, by name, declared that they were so poorly executed that he would not accept them. But other persons connected with the factory were so much delighted with them, that he finally accepted one and threw the other away among the objects that had already been condemned.

Very soon after, the accepted vase was sent, with other examples of work, to an industrial art exhibition held in the Palace of Industry. It was there seen, greatly admired and bought by the Art Buying Committee of the Government, for four hundred dollars, for the purpose of preservation in the Sèvres Museum, as a precious specimen of art. This astonishing appreciation of a thing he had at first condemned, and only accepted under protest, so angered Lauth, that he put it in the most out-of-the-way position he could find in the museum. This was carrying matters a trifle too far, and the proper influences were brought to bear upon the administrator to the effect that the vase was replaced in a position worthy of its merit. Lauth had the right to discharge Rodin, though he did not dare to do it, yet he was determined to get rid of him in one way or another. Such a disturbing element as Rodin ought and should not demoralize a great Government institution. It was a matter of no earthly moment if he was making the finest things ever seen in the factory, he did not please the administrator thereof, who, strange to say, was not an artist, but a chemist. To accomplish his purpose, Lauth wrote to M. Turquet, that Rodin wished to leave Sèvres, and he was willing that he should go away. The secretary, who knew very well that it was a fortunate thing for the Government to have such a man as Rodin in its employ, was surprised at this information, and he sent for the artist to come and explain his reasons for desiring to leave. When Rodin told him that the letter was false, and that he had no intention of leaving, but, rather, wished to remain, M. Turquet expressed his satisfaction and desired him to continue the production of the beautiful work in which he had already distinguished himself. As a fitting conclusion to his deceitful conduct, Lauth changed his tactics for the moment, and treated the sculptor with obsequious politeness and as though nothing had happened, even going so far as to deny that he had ever written to the Secretary.

Lauth still had the right to criticise Rodin's work, and this he never failed to do, being joined in this by Belleuse, who, for the first time, attempted to guide the mind and hand of his workman. This Rodin would not submit to. He had had enough of criticism from his inferiors, and he practically left Sèvres, going there only occasionally for an hour or two, though his name remained on the roll of workmen, and so remains to this day.

Of one of these vases, M. Roger Miles writes, in the *Journal des Artistes*, as follows: "The caprices of M. Rodin's imagination are as delicate as a breath borne on a gentle breeze. He is the living proof that *a beautiful disorder is an effect of art*. The 'Vase of Pompeii,' of which he is the author, comprises a frieze on a brown ground. To say that the subject is a difficult one is very little: there is everything in it; the personages follow in procession, group around each other, mix and entangle themselves; some make an offering to Ceres, others taste the ripe fruits of autumn; this one, protected by the green foliage, teaches a little cherub to read, while at her feet a spring sends forth a little rivulet that winds its silver current through the tender grass; farther on are the disciples of Bacchus who come staggering along with their foreheads crowned with green grapes. Everywhere a strange variety, everywhere a delicious fancy. The modelling is both exquisite and powerful. The vase denotes that the artist possesses an overflowing facility. His Persian vase is a jewel."

In 1879, Rodin entered two competitions, one for a monument to commemorate the defence of Paris, and the other for a bust of the Republic. Neither was successful. The sketch for the former was much admired by the sculptor's artist friends as possessing extraordinary merit. For the latter he made a large head wearing a helmet. Of it, the journal *La France* said: "A work of singular originality, but which the Jury could not accept. Instead of a

Republic, it represents a sullen Bellona with a physiognomy very dramatic." On another occasion the same paper referred to the bust as "a sculpturesque fantasy, a bedevilled fervor that makes one dream of Carpeaux when in his most audacious moments of imaginative composition." Other notices of the bust did not fail to recognize that it was conceived from a different point of view from that which the public had been accustomed to seeing.

By the spring of 1880, Rodin had managed to complete, in plaster, his statue of "St. John Preaching," the State had cast "The Age of Brass" in bronze, and both were exhibited in the *Salon* of that year. As recompenses generally go, he had a right to expect one of very distinguished character, but the exhumination that had followed the exhibition of "The Age of Brass," now appeared against the "St. John." The evident fact that the statue was much larger than nature did not overbalance the suggestion that "he must have had a large man for his model." He received a third-class medal, and the statues were better placed than his previous exhibitions had been. M. Turquet continued his recognition of the sculptor, by buying for the Government, the plaster statue of "St. John," for fourteen hundred dollars.

On the appearance of this statue there was repeated, among the sculptor's adherents, the same surprised enthusiasm — with the added interest that such a work would naturally excite — that had been aroused over "The Age of Brass." It created an immense excitement among artists, and the discussion over its qualities was lively and general.

While the notices of these statues, by the press, were neither extensive nor enthusiastic it is interesting to observe, that by examining twenty or more, beginning with one where the names only of the statues are given, and finishing with an article of two dozen lines, a gradually inclined plane of rising appreciation is discovered, which I am inclined to think represents the first grade of a subsequent general and highly eulogistic expression of the newspaper critics of Paris in regard to Rodin and his work. A number of writers simply said, "'Age of Brass,' by M. Rodin"; several others, "Rodin, 985, 'The Age of Brass'"; 986, "Saint John Preaching." Then, "Here are two austere bronzes, of a superb originality, by M. Auguste Rodin." Again, "If we look at the sculpture, we shall notice as without rival, 'The Age of Brass' and the 'Saint John Baptist,' by Rodin, full of life, power and character." Another a little stronger — "a man in the full vigor of his years, wasted by privations, but powerful and healthy above all suffering; this is the *Precursor*. Saint John comes towards you with long steps, mouth open, hand raised. What fire in his look and on his lips. What authority in his gesture! This statue by M. Rodin is a marvel of reality, of intimate concentration, of a precise and significant execution. He is animated by the soul of a Gothic sculptor. We have in him a master." Of "The Age of Brass," M. Paul Mantz, wrote as follows: "There is something strange and mysterious about it. It is a standing figure of a man of a primitive age; the style is curiously archaic and almost Grecian. This statue has no relationship whatever with the prevailing commonplaces." *L'Art*, for last year, contained an illustration of the "St John," from a drawing by Rodin.

The fault found with the statues was rather more emphatic than was the praise, but, as the years went on, this kind of criticism almost entirely ceased. "M. Rodin exposes, under the title of 'St. John Preaching,' the worst-built man in the world." "These two statues, curious to look at, are not wholly wanting in talent, but they seek to attract attention by too much pretense. This is to be regretted." "Incomprehensible, this 'Age of Brass' (Rodin). Why does this little man grasp his head? Why do his eyes appear to be blinded? Why, anyway, does he not stand straight on his legs?" "Too much of the pose and study of the studio. M. Rodin shows too much of what he has learned, in this good study, not to give a little more freedom to his imagination. 'The Age of Brass' has too much suffering in it, and too little of its author's philosophy and poetry. This *Precursor* recalls in no sense the legend of the great apostle, covered with goat-skin, and preaching the coming of the Messiah. Give more liberty to your timid imagination, M. Rodin." "For ugliness and triviality he approaches the extreme. M. Rodin shows us in his 'St. John' that vice has its manner of expression, and ugliness its degrees. It would be difficult to find anything more repulsive than this statue."

The sculptor himself was still pursuing the humble employment of a workman, though happier than usual, because he felt that a few members of his profession were concerned in his existence. The future, however, was not assuring, and there were no certain indications, even with a government friend like M. Turquet, that he could set up a studio as a sculptor and be sure of his daily bread. M. Turquet had purchased the two figures more as a personal matter than one supported by general art approbation, and his official permanency was not guaranteed for any certain period. So far as Rodin knew, he had not an influential friend in the world, and he was certain that he had powerful enemies. He was really in distress.

Imagine, then, his indescribable astonishment when, on answering a note from M. Turquet, he appeared at that official's office in July, 1880, and heard these words: "I wish to give you a commission to execute the model of a great door for the Museum of Decorative Art, the subject to be taken from Dante's '*Inferno*.'" With them appeared Fortune in all her unreserved and generous splendor. There was opened to the sculptor's eyes a vista such as had never before dazed an artist of modern times.

When the French government gives important commissions to artists it provides them with studios in which to execute their work, and Rodin was given one at 182 Rue de l'Université, on the premises of the State, known as the Marble Depot, or the yards and warehouses of marbles and works of art belonging to the State. In the same memorable month of July the sculptor took possession of the studio marked J and began his work. There we will leave it, shut out from the reader, as it was hidden from the public, for the next six years, and occupy ourselves with other matters relating to Rodin with which the world was more or less familiar.

T. H. BARTLETT.

(To be continued.)

THE LUMBERMEN'S DEMAND FOR A NEW LIEN LAW.—II.

PEOPLE anxious to be satisfied from actual experience how the law which the lumber dealers want would work in practice may profitably turn their attention to the operation of the new Rhode Island law. Until recently material-men had no lien in that State; last year, however, the Legislature under the impetus of a decision by the Supreme Court of the State, and stimulated, we presume, by the organized efforts of the lumber-dealers, enacted a general lien law. The law seems to have been passed without attracting much notice or discussion, and gave to material-men an absolute lien without notice to the owner.

The first case under the new law was that of a school-house for the town of East Providence. The contract seems to have been drawn by the architect in the usual way, providing for partial payments as the work progressed; and these were made as due. After the contract was completed and the last instalment paid, the committee was startled by the filing of liens to a considerable amount; the contractor failed, and the town will be obliged to settle the bills.

The case has occasioned considerable comment, and, as predicted in our former article on this subject, the blame seems to fall on the unfortunate architect; the individual members of the committee disclaiming all responsibility for the form of the contract. While the architect is probably not legally responsible for drawing the contract in such a manner as to render the committee liable to pay twice over for the material; still, his position is not a comfortable one, and it is safe to predict that no more such contracts will go out of his office.

It seems to be generally taken for granted by the Rhode Island press that for the future it will not be safe to make partial payments on a building contract, and that the bulk of money must be withheld till the time for filing liens has expired.

Turning to Massachusetts, we understand that the Master-Builders' Association of Boston at a meeting held on January 22 voted to oppose the bill which the Lumber Dealers' Association has presented to the State Legislature, giving to material-men a lien without that notice to the owner which the law now requires. It is encouraging to find that the leading builders' organization in New England, comprising among its members most of the large material-men doing business in and about Boston, takes a decided stand against the unjust attempt of a few lumber-dealers to throw the burden of their own improvident business methods upon the owners of real estate. The opposition of the Master-Builders' Association ought, of itself, to defeat the lumbermen's scheme.

The Chicago Builders' and Traders' Exchange at its fifth annual meeting, held January 21, 1889, resolved with substantial unanimity in favor of the repeal of all lien laws.

The several States and Territories of this country may be divided into two classes according as their respective lien laws do or do not protect the owner in respect to payments made to the contractor before notice from material-man or sub-contractor. In the first class are found the following: Maine, Massachusetts, South Carolina, West Virginia, Arkansas, Indiana, New Jersey, New Hampshire, Connecticut, New York, Pennsylvania, Ohio, Illinois, Iowa, Michigan, California, Alabama, Georgia, Kentucky, Virginia, Texas, North Carolina, Mississippi, Louisiana, Utah, Idaho, Colorado, Wyoming; and probably also Oregon, Arizona and Dakota. In Vermont material-men have no lien whatever.

In all of the above some means is provided by which the owner can protect himself against the danger of being compelled to pay twice over for his house without exacting bonds from the contractor or postponing the bulk of the contract payments to the end. Sometimes, as in Maine, the owner may prevent the running of a lien by

[Continued from page 46, No. 683.]

giving notice to the material-man; sometimes, as in Massachusetts, South Carolina and elsewhere, the material-man must himself give notice before delivery. More generally, however, the so-called "subrogation" system obtains, under which any person furnishing labor or material may, at any time, put a lien upon the building; but all payments made by the owner to the contractor prior to the filing of the lien are protected, and the lien holds only the unpaid balance of the contract money. The latter system is undoubtedly the most equitable, as it is the most common: it gives to the material-man all he ought to have, viz., the right to be put in the contractor's place in respect to after-accruing payments; and, as the owner can protect himself by taking the simple precaution to make no payments on the contract without preliminary inquiry at the Registry of Deeds, there is no object for him to hold back his payments to the end of the job, or to exact heavy bonds.

In many of these States and Territories, however, the machinery is extremely cumbersome, and the precautions to be taken are so numerous as to greatly embarrass owners and contractors. Thus the Illinois law of 1887, while theoretically protecting the owner against payments before notice of the lien, is so complicated in its provisions as to have become obnoxious to nearly all sections of the building trades. Hence the opposition of the builders and contractors, indicated by the vote of the Chicago Builders' and Traders' Exchange referred to above.

On the other hand, in the States of Maryland, Delaware, Missouri, Kansas, Rhode Island, Florida, Tennessee, Nebraska, Nevada and Minnesota, and the Territories of Montana, New Mexico and Washington, the owner is completely at the mercy of the contractor and material-men unless he gets bonds from the former, or draws his contract in such a manner as to enable him to withhold the great bulk of the contract-money until the last day for the filing of liens has elapsed.

In the District of Columbia and in Wisconsin the statutes are so vague as to render it impossible, in the absence of judicial decision, to determine whether or not the owner is protected as to payments made before notice.

In Pennsylvania, New Jersey, and Virginia the law has recently been changed so as to afford to owners greater protection than they had before. In Florida, Rhode Island, and Tennessee the course of recent legislation has been the other way. In Missouri, it seems that the Kansas City Builders' and Traders' Exchange is endeavoring to procure the adoption of some system which shall relieve owners and contractors from the burden of the lien law as it stands in that State.

On the whole, it cannot be said that the demand for a lien law that will render the owner liable to material-men without protection, except at the expense of the contractor, has made much headway, though it has had for many years the support of the various organizations of lumber-dealers that are scattered over the country. The tendency of legislation and public opinion generally has been in favor of the simplest system that will give to material-men the right to avail themselves of the unpaid instalments of building contracts, without subjecting owners to the risk of paying for their houses twice over, or contractors to the necessity of giving heavy bonds. The general opinion among the contractors themselves is probably hostile to every kind of lien law, at least in so far as material is concerned. The public generally, if not prepared for the total abolition of our lien laws, will certainly oppose the extension of them in any manner that will operate as an outrage on contractors and a swindle on owners.

To give to material-man an absolute lien is to make of them a special favored class in the community, having rights and privileges not open to other kinds of merchants or to the people at large, and is inconsistent not only with sound business methods, but with the essential principles of justice. It is class legislation in its most offensive form, enacted for the sole benefit of people who, by their own confession, are incompetent to manage their affairs without the assistance of the State, and selfish enough to wish to shift the burden of injudicious credits on unsuspecting and innocent third parties, whom they have not had the honesty to notify beforehand.

It is fortunate that the fate of similar attempts during the past few years leaves little ground to fear that the present attack of the lumber-dealers on our State Legislature will be successful.

THE ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

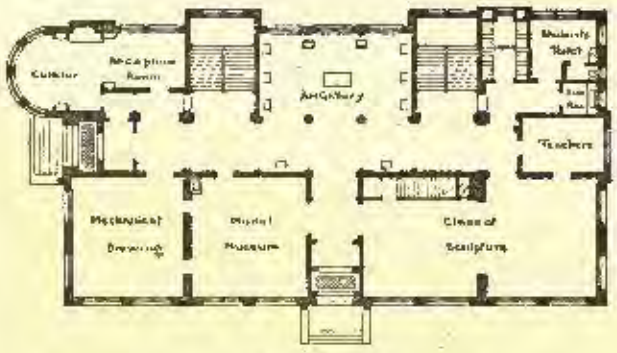
MAIN ENTRANCE TO CITY-HALL, ALBANY, N. Y. MR. H. H. RICHARDSON, ARCHITECT.

[Gelatine print, issued only with the Imperial Edition.]

HOUSE OF MR. B. F. WILLIS, ARCHITECT, YORK, PA.

PROPOSED materials: Dark blue limestone with red-brown pointing for all base work as indicated as stone. Sills, lintels and porch-coping, Hummelstown "tool-dressed" brownstone. Red selected stretcher brick and red-brown mortar for all other exterior walls and chimneys. Dark blue slate roofs. Hardwood finish throughout interior: stairs, hall and dining-room, quartered oak; parlor and library, Mexican mahogany; kitchen, etc., maple. Second story throughout, selected North Carolina pine. First story floors principal rooms, oak; second floor throughout, also kitchen, etc., maple. Sand-finished plaster throughout for oil painting.

THE NORMAL ART SCHOOL, BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.



FIRST FLOOR PLAN

THIS school is a State institution. The building was erected in 1886. Appropriation for its construction was $85,000. It was completed inside of the appropriation. Materials used in construction are brick and brown freestone. The building is so arranged that the staircases, toilet-rooms and coat-rooms occupy the south and west, while the north and east are wholly available for the working purposes of the school.

THE ARCHER BUILDING, ROCHESTER, N. Y. MR. C. B. ELLIS, ARCHITECT, ROCHESTER, N. Y.

THIS building, on North St. Paul St., covers an area 266' x 112' and cost $210,000.

STATUES OF JOHN THE BAPTIST, BY AUGUSTE RODIN AND BY DONATELLO.

SEE article elsewhere in this issue.

PROPOSED HOUSE FOR C. D. HOSLEY, ESQ., SPRINGFIELD, MASS. MR. GUY KIRKHAM, ARCHITECT, SPRINGFIELD, MASS.

PROPOSED HOUSE FOR H. F. CROCKER, ESQ., FITCHBURG, MASS. MR. GUY KIRKHAM, ARCHITECT, SPRINGFIELD, MASS.

HIGH FLATS, SYRACUSE, N. Y. MR. J. M. ELLIOTT, ARCHITECT, SYRACUSE, N. Y.

THE NATIONAL BANK OF WASHINGTON, WASHINGTON, D. C. MR. J. G. HILL, ARCHITECT, WASHINGTON, D. C.

GUTTERS.

A picturesque Corner, Providence, R.I.

THE humorist who cursed the memory of his "Pilgrim Fathers" for presuming to settle on a "bleak New England shore" was an architect by profession, and his temper was doubtless more stirred by the effect on his fortunes, through his work, than by his more immediate physical discomforts.

A region foreordained for the use of Esquimaux and polar bears is a trying location for builder and householder, and to the daily toil for bread is added the greater toil needed to secure reasonable protection against inclement weather and violent changes of temperature.

In our earlier civilization, when the programme of daily life was simple, "when honest hearts made iron arms, and tender maids were tough," the minimum of shelter that would now be held insufficient

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Heliotype Printing Co. Boston.

No. 653. American Architect and Building News, Mar. 2, 1889.

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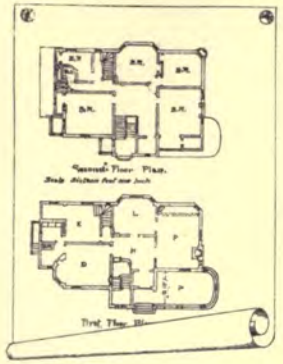

Suburban House, at York, Pa.
for Mr. B. F. Willis.

B. F. Willis Architect. York, Pa.

Heliotype Printing Co. Boston.

No. 655. American Architect and Building News, Mar. 2, 1878.

STATE · NORMAL · ART · SCHOOL
BOSTON · MASS

H·W·Hartwell & W^m C·Richardson · Archts
68 · Devonshire · St · Boston

Heliotype Printing Co Boston.

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ENTRANCE TO THE CITY-HALL, ALBANY, N. Y.

H. H. RICHARDSON, Architect.

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ARCHER BUILDING, NORTH ST. PAUL STREET,
ROCHESTER, N.Y. — C. S. ELLIS, ARCHITECT.

HIER FLATS.
SYRACUSE, N.Y.
J. M. ELLIOTT, ARCHITECT.

Heliotype Printing Co. Boston.

DONATELLO, SCULPTOR.
FLORENCE.

· A. RODIN, SCULPTOR ·
PARIS.

· ST JOHN THE BAPTIST ·

DONATELLO, SCULPTOR.
VENICE.

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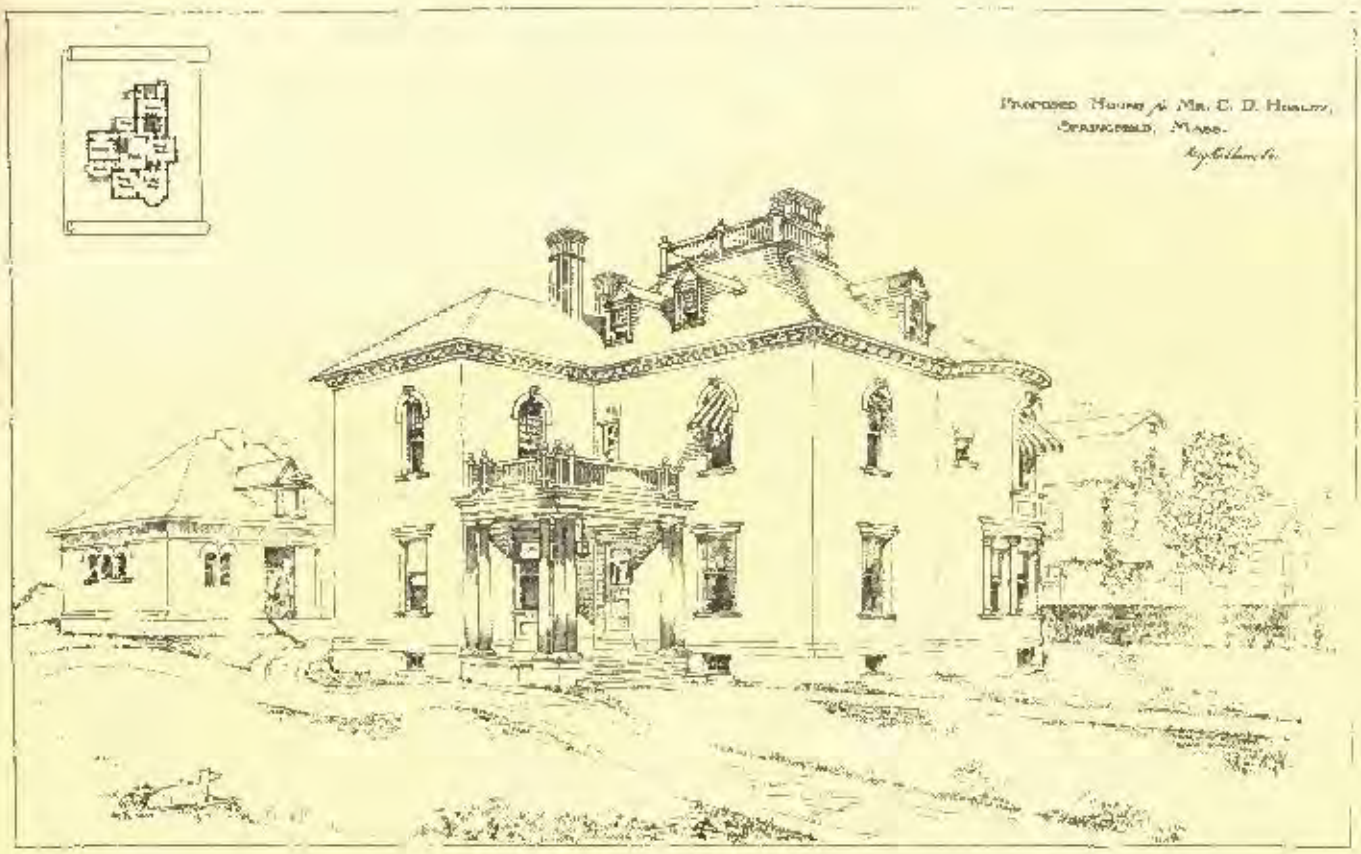
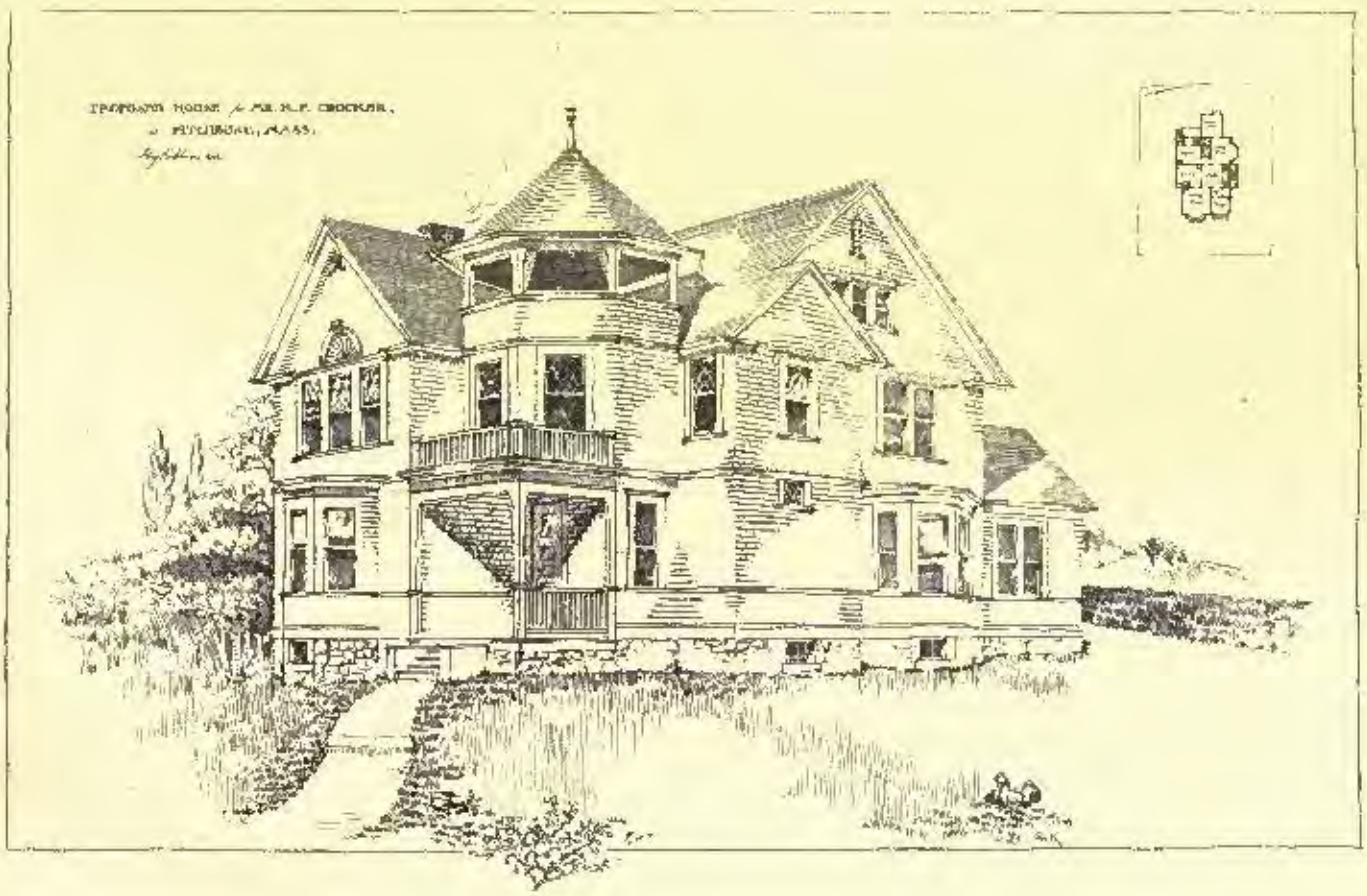




Heliotype Printing Co. Boston

for a respectable horse was thought ample for wife and babes. The "Thanksgiving" family gathering was not only around the fire, but so far as possible in the fireplace; and the guests turned themselves, as well as their roasting apples, before the roaring blaze, so as not to be done all on one side. But all this has been improved away. The generation of men who boasted that they had to kick a snow-drift from the quilt before rising in the morning is fast passing on, and the descendants of the tender maids of Puritan days lack the necessary muscle to enable them to totter the length of a block, and are more affected by a draught than their grandmothers were by a cyclone.

The modern architect, "to the manner born," must follow the changed conditions and patiently endeavor to make his buildings hot-houses in winter, cold-blast refrigerators in summer, and hermetically tight all the year round.

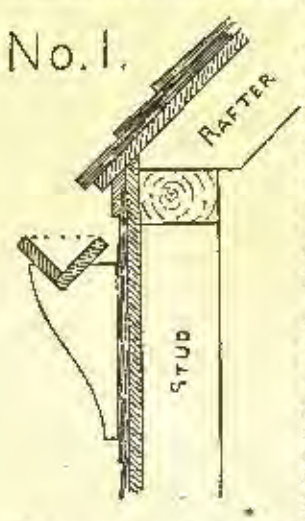
Professional testimony would be somewhat at variance on the relative importance of the different branches of weather protection or neutralization. Insufficient heating, imperfect or excessive ventilation, and leaky roofs, all claim their victims; but perhaps, in these later times of the picturesque and ornate, the sufferers from leaks may claim a first hearing. In the simple old days, when houses were used principally for sleep or sickness, and "God's canopy" was the most familiar ceiling, and the good wife's worldly possessions were few and simple, and not readily damaged, a few stains of rain on plaster or wood were a pleasant variation from the usual monotony, and there was reason for satisfaction if the water took any other course than down the back of one's neck.

But now one's clients live in bric-à-brac shops and art-museums, surrounded by palace frescos, and they walk on costly rugs, and leaks mean money out of pocket and wounded vanity and vexation of spirit — all which eventually result in goading to the verge of desperation the ever-responsible architect.

Surely, if the man who makes two blades of grass grow where one grew before (a very simple result of time and fertilization) is a public benefactor, the roof doctor, who can so prescribe as to reduce two leaks to one, is entitled to a share of gratitude.

Of the earliest colonial dwelling, the shanty or log-hut, no local examples remain, but they doubtless differed little from similar structures still common to all the wild country of the Southern and Western States. The same style of roof that sheltered Miles Standish answers for Uncle Tom's cabin or Buffalo Bill's ranch. The roof, as tight as practicable, was made steep, in order to shed water rapidly, and, as houses were generally located near streams or springs, every effort was made to convey the water away from the walls as quickly and directly as possible. This was done by digging a shallow trench in the ground under the eaves, banking the earth against the walls as an additional protection, and connecting the trench by another with the nearest lower ground.

With the rapid advance of civilization, the need arose in some locations for soft water to wash clothes, and the first forms of gutter, conductor and cistern were devised — the two former rough troughs, and the latter a section of a large tree dug out deeper. These were soon replaced by the V-shaped eaves-gutters and spouts, formed of strips of boards nailed together, and leading to a rude barrel or cask — types which may still be found doing their honest work on many a New England farm-house and barn. In their elementary and radical features they have never been improved upon.



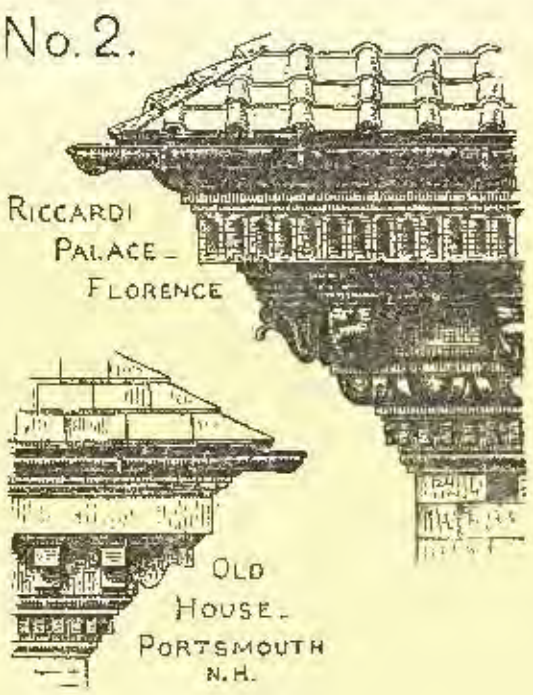
When the farm-house gave way in a measure to the more stately colonial mansion, the cornice-members devised for simple use were superseded by an imitation in thin boards of the stone and brick Renaissance work of the mother-country; but often the formal mouldings were supplemented, if not improved, by a trough-gutter slightly removed from the eaves on iron brackets.

It is a curious coincidence that in a different climate the workers in the parent style were led or driven to the same expedient, as seen in many Italian Renaissance buildings. The foreign and domestic examples are given together in the cut.

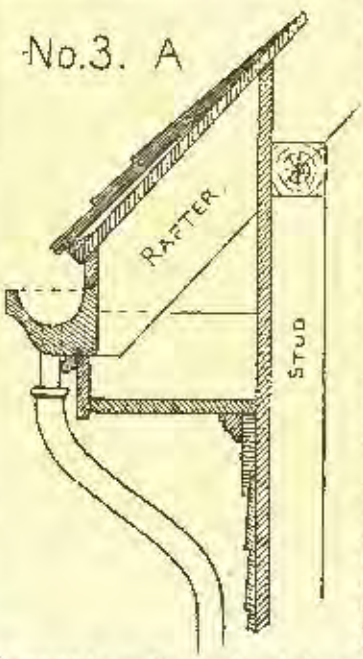
There seems, however, to have been no persistent effort made to modify and adapt this sensible makeshift so as to establish a type that should be both serviceable and elegant. Instead of showing improvement, the art of building deteriorated, and the wooden or sheet-metal gutters of wooden houses were concealed behind cornice mouldings, and so located and arranged as most readily to conduct the water into the house or walls in event of any slightly defective construction. The common styles of gutter in use for many years past are shown in the following diagram sections; *A* being the common form, *B* often known as the New York gutter, and *C* the shallow gutters formed in metal roofs. There are other modifications, but these fairly represent the larger number.

It is plainly to be seen with all of these forms, that the least carelessness in the fitting of parts by the journeyman or any shrinkage of material may open a course for the rain directly into the walls.

It often happens that a leak in the first story can be traced directly to the cornice; and, even if the soakage is not enough to



show on inside walls or ceilings, it keeps the outside of walls so damp that the paint is continually peeling from clapboards and finish. But this is not the worst. Any fairly perfect construction should be proof against ordinary storms of rain or snow, or even of rain or snow driven horizontally by the wind. But, in the climate of New England, we have both the rain and snow in connection with the most extreme and sudden changes of temperature. Almost summer warmth is succeeded in a few hours by Arctic cold and drifting snow; and this, again, by a thaw, with floods of rain that back-up through every minute crack and pinhole in a roof. In fact, the inexpert would be astonished to see the smallness of the crevice which has grown in imagination to the dimensions of a considerable conduit.



If moist snow drifts heavily upon a roof, and is made still more moist and compact by the warmth of the house, it is liable at any time to form a dam underneath that shall back the water of a thaw or of succeeding rains up against the roof-covering in such a way as to work through any structure not designed, built and maintained with the greatest care.

To employ a new and untested material for covering is as hazardous as to use without modification a style of roof foreign to our climate.

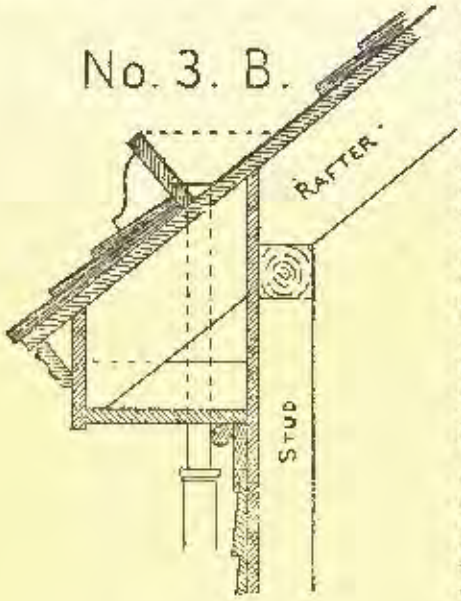
Many an architect has come to grief through the eccentricities of the grouped gables, chimney-stacks located at the foot of valleys and other peculiarities of English design; or the flat pitches or tiles and stone-gutters of the south of Europe. Everything in building must be acclimatized and domesticated. A client with a long purse and a love for novelty may be temporarily pleased by a clever importation of style. But, if comfort is lacking in his house, if ceilings drip and inside walls stain, and books and pictures suffer from mould and dampness, he soon tires of novel effects and their author, and tries for a more practical investment.

Much can be done to avoid accidents by making roofs as steep as possible — never less than 45° pitch for slate or shingles — by omitting level valleys and flats between pitches, and inclines towards upright walls; and by avoiding all unnecessary breaks and projections, and allowing sufficient opportunity for the expansion and contraction of flashings under varying temperatures; and lastly, by employing only the best workmen and materials.

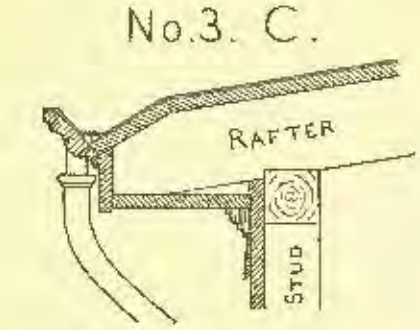
But, with all precautions, it is somewhat unusual for a roof

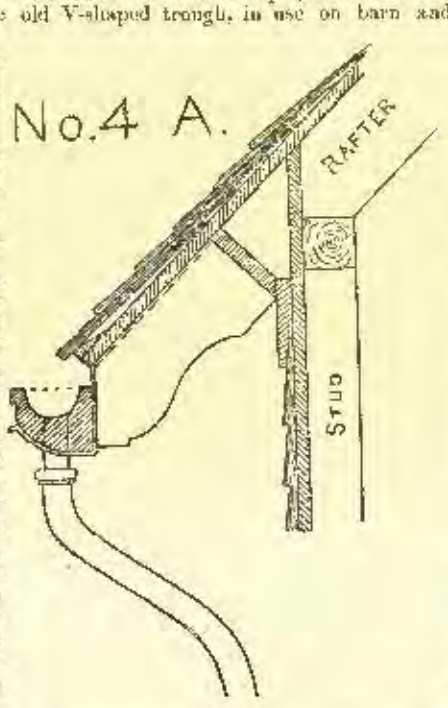
exposed to the full fury of the elements to stand for twenty years without showing some slight defects.

An ordinary two-story wooden house shrinks in height during the first year of its existence an inch or more, while well-built chimneys settle very little. Consequently there is usually a rupture between the counter-flashings attached to the chimney and the under-flashings and roof-covering, which causes the slates or shingles to stick up like the ruffled feathers of a hen, and necessitates repairs of this portion of a roof within a year or two from the time it is completed. Something of this could be prevented by the use of well-seasoned lumber; but well-seasoned lumber is practically a thing of the past.



But even when the design is proper and the construction is sound above the eaves, we have in the ordinary forms of gutter the worst sort of incentive to an ice-dam and consequent leakage. If there is the slightest check to the flow of the water through the leaders or conductors caused by the freezing of the pipes near the ground, or in some part that is cold from absence of sun or special exposure, it at once backs up, freezes in the gutter, and ice begins to accumulate and work back onto the roof. At the next stage of thaw it melts underneath; and the water, held back by the frozen case, is forced up on the roof to search out its weakest spot, and thence invade the house. The old V-shaped trough, in use on barn and farm-house for two hundred years, furnishes a rough model for the practical remedy of the difficulty, and a trifling exercise of ingenuity and taste will adapt it to modern conditions. The essential points are a gutter so detached and hung as to allow the water to flow over the back, as well as front, in case of any unusual check; and eaves of the skeleton or open-rafter form, or, at any rate, eaves sloped upward from the gutter, so that the water will have to run up hill to reach the wall. Such combinations have undoubtedly been employed in more than one instance; but two are here illustrated that have been used by the writer for more than twelve years with unvarying success; so far as known no leakage having occurred, such as usually follows with the common form.

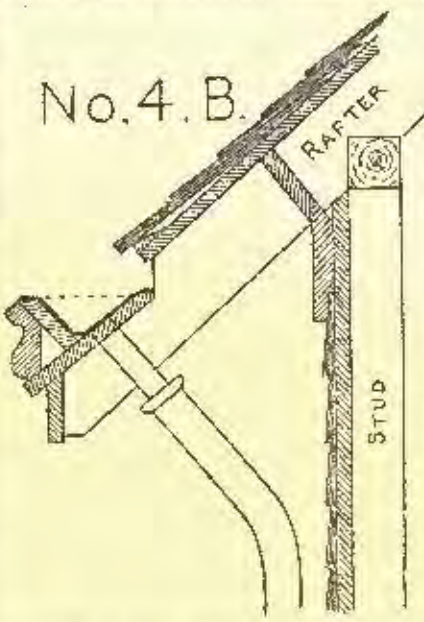




A represents the skeleton-rafter form, with a trough-gutter hung to every second rafter by a ¼" x 1" wrought-iron stirrup screwed to the rafter, before the eaves-boarding is placed, and screwed to underside of gutter.

B represents a modification of the "New York Gutter," so-called, made of boards and lined with sheet-metal.

Both are susceptible of unending variety of treatment, and can be made more or less expensive without the loss of their leading characteristics. If one is not slavishly bound to a Chinese fidelity of imitation, there is no form of domestic building to which these gutters cannot be appropriately suited. Even in the matter of design they have many good points. The shadow thrown by the sloping eaves is black and telling. The light that passes over the gutter and under the eaves makes a bright pattern on the wall, that is as effective as that made by a bracketed cornice. The rafter ends and underside of cornice are so much in shade that slight defects in material are obscured, and fairly good spruce-rafter ends and mill-planed spruce-boards answer for most purposes. The paint on the underside of such a cornice will outlast three paintings of the rest of the building.



Of the many practical advantages of this form, the fact that it can be readily repaired or replaced is not the least, and of almost equal importance is its reliability and strength as a support for the painters' or other hanging stage.

When the projection of eaves is not great, the trough may be set on wooden or iron brackets secured to the wall; or in very simple constructions the ends of the rafters may be notched and the gutter set on the rafters.

In freezing and thawing weather there is sometimes a drip from this arrangement of cornice, and long icicles often form. But, as the object of such contrivances is to keep the water out of the house, this peculiarity may be quoted in their favor. It is not suited for use on the line of a sidewalk, as city buildings are often located; but in such cases the danger from eaves sloping towards the street is very great in many ways, and they should be prohibited by law.

The sole hope for the establishment of a local and characteristic style of architecture lies in a careful adaptation of features in building that are found, through careful trial, to suit the manners and customs of the people and the requirements of the climate. Bad types of gutter have made trouble enough. If these modifications of ancient examples promise improvement, architects cannot do better than to favor their regular use in some of the many forms that will readily occur to any one giving them full and careful consideration.

John A. Fox.

BUILDING LAW.

HAVE ARCHITECTS A LIEN?

Boston, February 18, 1889.

Question.— Will the lien laws of Massachusetts allow an architect to attach a building for labor on plans and specifications for said building? Is he not a mechanic in the sense of the law?

Answer.— The Massachusetts lien law is not restricted in terms to mechanics; it gives a lien for "labor performed or furnished in the erection, alteration or repair of any building," etc. Similar statutes in other States have been construed to give to an architect who superintends the erection of a building a lien for that work, and, if he has also prepared the plans and specifications under a general contract for the whole, his lien has been held to embrace his entire bill.

This rule has, however, been much criticised by other courts, and we do not think that an architect would be permitted in Massachusetts to maintain a lien.

MECHANICS' LIENS.—TIME FOR FILING.

Question.— A sub-contractor, say a painter, has to all intents and purposes completed his work and removed his materials. Twenty-eight days after (not having been paid by the contractor) he puts in an appearance with paint-pot and brush and repaints one window, in order to extend the time of expiration of lien to thirty days from that date. Perhaps this one window was intentionally left without one

cost of paint, as called for in the specification. Will the act as above extend the time for filing a lien?

Answer.— Whether a claim of lien has been filed within the time allowed by law is a question of fact for the jury. If the last work is merely colorable, done without necessity, and with the sole intention of extending the time for filing a lien, the jury ought to find for the owner. Whether such a verdict would in fact be returned is, of course, a matter of uncertainty.

Question.— A sub-contractor, a mason, for instance, has left the work for twenty-eight days, and on the twenty-ninth appears and cleans down and sills the same, having been ordered by the owner and architect not to do so, as they were not ready to have it done. Will that extend the lien?

Answer.—The whole matter is for the jury, as explained above. No question of law is involved in such cases except when the evidence is so overwhelmingly one way that the court will take the case away from the jury or set the verdict aside. It seems needless, however, to point out that such a condition seldom prevails in lien cases, as the mechanic can almost always produce some evidence in support of his claim upon which the jury is entitled to find for him if it chooses.

MECHANICS' LIENS.

Question.— Please give me your opinion of the following case in columns of the American Architect: A, the contractor, employs B, a laborer, to work on a building which he is erecting. A pays B his wages for a few months, then fails to pay him his January pay, and at the end of February pays him for work done during that month. Has B a right to lien on building for pay for work during January? *Yours truly,* *A. H. F.*

Answer.— We think he has. The appropriation of the money to the work for the last month would not, we think, amount as matter of law to a waiver of the lien; that would be a question for the jury, and, in the absence of strong proof that the acceptance of the money and its appropriation in the manner described was intended by both parties as an abandonment of the lien, the verdict would undoubtedly be for the plaintiff.

FORM OF NOTICE TO TERMINATE CONTRACT.

Question.— What form is proper for an architect's notice to a contractor who has failed to comply with his directions, and what form is proper when the contractor becomes bankrupt and refuses to pay his workmen?

Answer.— No special form is required. The architect had better put his notice in the form of a letter addressed to the contractor, quote the clauses of the contract permitting the termination of the contract, then recite the manner in which the contractor has failed to comply with the contract, and conclude with a simple statement that the owner or architect, as the case may be, has decided to avail himself of the privilege to determine the contract, and does so by this letter. If some preliminary notice is required, the letter should state that unless the terms of the contract (specifying them) are complied with, the contract will be considered as at an end on such and such a day. The architect should take a letter-press copy of his letter, and should see that the original is delivered to the contractor in the presence of witnesses.

THE CANTON (OHIO) SCHOOL-HOUSE COMPETITION.

CANTON, OHIO, February 11, 1889.

Question.—Enclosed I send you a circular issued by the Board of Education of this city. The advertisement on the first page is a copy of the advertisement as it appeared in the daily papers.

I competed. My design was reported by the building committee as being the best — in fact, the only one which complied with the requirements of the circular — but the Board refused to act, and employed an architect to make drawings who was not a competitor.

Am I entitled to anything for my design? Note particularly Section 17 of the requirements.

Yours very truly, *Guy Tilden.*

The notice to architects in the newspapers, referred to in the above communication, is as follows:

Competitive drawings will be received by the Building-committee of the Board of Education of Canton, Ohio, until noon of June 20, 1888.

Said drawings are to conform to the programme of requirements and instructions prepared for said building. Said programme may be had by applying to the Chairman of said Committee on Buildings, Isaac Harter. Any drawings not in accordance with said requirements will not be considered. By order of the Committee on Buildings.

CLERK OF BOARD OF EDUCATION.

The "Programme of Requirements and Instructions" to the competing architects contained the following clauses:

16th. Said competitive drawings are to consist of a foundation plan, a first and second story plan, a front and side elevation, all drawn to a scale of eight feet to one inch, and a perspective view measuring eight feet to one inch on the near corner. All to be executed with pen and black ink on ordinary white drawing-paper. Said drawings may be accompanied with a description or any information that will assist a competent builder in making an approximate estimate.

17th. The architect whose drawings are accepted by the Board, as the best of all submitted in this competitive contest, will be awarded the work at a commission of two-and-one-half per cent, and all unsuccessful architects will have their drawings returned without any compensation. Any drawings received which do not conform with the foregoing requirements will be returned by the Building Committee without compensation.

18th. All drawings must be in the hands of the Chairman of the Building Committee before noon of June 20, 1888. It is the understanding that for these two buildings the same plans will be used, both being alike, and that the School Board of the city of Canton will pay but one commission of two-and-one-half per cent to the successful architect for the plans to be used for both school-houses.

A subsequent communication from Mr. Tilden makes clear that a commission of two-and-one-half per cent was expected to cover drawings and specifications only — a point which the circular itself leaves in some obscurity.

The programme in this case contemplated an acceptance by the Board as the condition of success; and, if that had been all, the Board would have had the legal right to reject all plans offered without compensation of any kind. Architects who undertake to draw plans which shall be acceptable or satisfactory to the owner or a committee or board should understand that they are wholly without remedy if their employer does not find the plans satisfactory. It is so with a tailor who undertakes to make a suit of clothes to the satisfaction of his employer; in case the latter does not like the suit he can return it, and the tailor must stand the loss. Cases of this kind, where the work furnished is not in fact used by the employer, and can be returned by him, are, of course, to be distinguished from cases of work done or material furnished in building operations, for there the owner does in fact receive the benefit, and the contractor is entitled to recover the value of the work and materials, even if he has not strictly complied with the terms of his contract. He cannot recover more than the contract-price, deducting what it will cost the owner to make the work good; but he can recover something, and therein his case differs from that of an architect or a manufacturer who undertakes to furnish plans, stoves, or anything else of a movable nature which are to be satisfactory to the owner, and which he can return if he does not like them. So, in the above case, if acceptance by the Board had been an express condition of the competition, our correspondent would have no remedy.

But Section 17 provides not simply that the drawing shall be accepted by the Board, but they are to be accepted by the Board "as the best of all submitted." We think a fair interpretation of this qualifying clause is that the Board bound itself to accept the plans which it considers the best; and their refusal to adopt any of the plans would seem to be a breach of the contract held out by the prospectus and accepted by each competitor when he handed in his plans.

We think, therefore, that Mr. Tilden has a case against the Board of Education of the city of Canton. The measure of damages would probably be the value of the time and labor expended in preparing the preliminary drawings; that is, whatever a jury would think was a fair compensation for the expense and trouble he has been to. If the drawings had been accepted by the Board, and it had then refused to permit the successful architect to complete his plans, the measure of damages would include whatever the jury would think would have been the profit to the architect on the whole transaction; but where the cause of action is the failure of the Board to accept any plans at all, the measure of damages would be simply the value of the time and labor bestowed upon them; and we do not see why each and all of the competing architects should not have a separate action, and recover from the Board of Education the value of the labor and time expended by him. The contract of the Board was, first, to accept some one plan, and second to allow the architect whose plan was accepted to go on with the work. We think that every person tendering plans conforming to the conditions of the competition can hold the Board liable for a breach of its preliminary obligation to accept some one of them.

SOCIETIES

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.

THE regular monthly meeting of the Engineers' Society of Western Pennsylvania was held February 19, in the rooms of the society in the Penn Building.

A good attendance of members was present and greatly interested in the reading of the two very able papers prepared and read by Prof. John W. Langley, of the Allegheny Observatory, on "International standard for the analysis of iron and steel" and H. D. Hibbard on the subject of "Welding metal by electricity," illustrated by samples.

The attention shown by members manifested their interest in the subjects read and discussed. A committee was appointed to consider and report upon the "Best methods to construct and maintain Public Highways," in the State and recommend legislation relative thereto. After which the meeting adjourned.

The library rooms are open daily and engineers from any part of the country are cordially invited to call, when in Pittsburgh, and make themselves known to the Secretary, Col. S. M. Wickersham.

D.

Illinois State Association of Architects.

At a regular meeting of the Illinois State Association of Architects which convened the 18th inst. in Chicago, the following resolutions were unanimously adopted:

"*Whereas:* The Illinois State Association of Architects, together with their professional brethren in all parts of this country, feel a deep interest in the course which the United States Government shall pursue in the designing and construction of its buildings; and

"*Whereas:* A change of administration in the Government is about to take place, and changes in this branch of the public services may follow; therefore be it

"*Resolved:* That the Illinois State Association of Architects hereby respectfully petition the President-elect, and the incoming Secretary of the Treasury to make such changes in the practice of designing and erecting public buildings as shall more nearly conform to the methods adopted by independent corporations and private individuals, thereby obtaining a much better grade of buildings at considerably less cost; and be it further

"*Resolved:* That we distinctly disclaim any intention to reflect upon the incumbent of the office, or on any of his predecessors; believing that their comparative want of success is due to the system under which they were laboring; yet, if a change is made in the office of Supervising Architect, we respectfully request the appointment of some architect whose energy, skill, experience, executive ability and integrity shall be thoroughly established, and who is in sympathy with the desire for reform in the methods of the Government, so far as they relate to the architectural design and administration of its public buildings, as expressed by the resolutions of the 'Western Association of Architects' and the 'American Institute of Architects.'"

In pursuance with the instructions of this Association, we take pleasure in forwarding copies of the above resolutions to you with the request that the subject matter of this communication may be laid before your Society at the earliest available opportunity; and with the hope that you will earnestly cooperate with us in the endeavor to correct the obvious evils of the present methods of Government building. Will you kindly distribute surplus copies to the officers of any local architectural Societies or Chapters which we may not have reached in this distribution.

Very truly yours,

William W. Clay, *President.*
Osborne J. Pierce, *Secretary.*

COMMUNICATIONS.

A PERSONAL EXPLANATION.

To the Editors of the American Architect:—

Dear Sirs,—The closing sentence of your letter gives me opportunity to say a few additional words, which I regret cannot be said verbally to avoid any misconstruction.

One of the most prominent of ——— architects told me that it cost $50.00 to get a gelatine print into the *American Architect*, and, while he is a man in whom I have perfect faith, I could not let the matter go without testing it for myself. I do not believe that he bears your journal any ill will. I have also heard some sharp criticisms of the conduct of it from Western men whose position in the profession entitles their opinions to consideration. No one can realize so well as yourself the case of criticism as compared with the difficulties attending the production of such a work, and the best architects in the country are to blame in no small degree for the condition in which we find things. We used to see occasionally a sketch of Mr. Peabody's or one of Stanford White's for Richardson, but now they as well as Mr. Hunt, Mr. Post, Mr. Withers and many others are conspicuous by their absence. They have the best of examples across the water in such men as Ernest George, Alfred Waterhouse, Norman Shaw, J. L. Pierson, Webb and Bell, etc. It is small pleasure to see the paper filled month after month by men no better than myself—is there no influence that can be brought to bear upon them?

I suppose it would be inexpedient but I should like to see a department of anonymous criticism of architectural work, whether it agreed with my conclusions or not; it would stimulate thought and arouse discussion, which is certainly better than apathy. I should like to see a column of questions and answers similar to those in the *Building News*. Some of the Western men thought that the principal architectural journal should have had some representative at their convention and did not hesitate to say so. This is but an individual expression of feeling brought about by your letter so far as the suggestions are concerned, and I am sure will be received as intended.

Yours very truly, Westerner.

[The answer which Westerner received from us in reply to a letter which antedates the one above, and intended by him to test the truth of the allegation for him-elf, must have shaken his belief in the trustworthiness of "one of the most prominent of ——— architects." Like the boy in the story who lied, this prominent gentleman made a misstatement, perhaps intentionally, perhaps only giving utterance to a belief that may be current in ———. With one exception, no man has ever paid any money toward procuring the publication of any design in the *American Architect*. Oddly enough the only man who has paid was Henry Hobson Richardson—of all men the one who had least reason to expect such treatment. Mr. Richardson declined to allow any of his work to be published save as gelatine plates, and several times during the early years of this journal, when the cost of gelatine printing was practically prohibitive for our uses, we accepted his offer to bear half the expense of printing such plates as he preferred. It is barely possible that during these years we may have replied to others making similar requests that we could only grant them under similar conditions. But never of late years. It seems very hard for some minds to conceive the possibility of independent and impartial action on the part of the editors and for years, we know, there existed a belief that the journal was managed in the interest of a "clique" or as an attachment to the American Institute of Architects, because that body had voted to adopt it as its "organ of publication"—the result of which action has been that perhaps a dozen times during as many years official documents have been sent us for publication. But in spite of the internal evidence afforded by our pages which showed such catholic range of selection as made it difficult to determine who were the members of the favored "clique" to whose glorification all our efforts were said to be directed the belief died hard—if it be yet dead. In the words we employed in answering our correspondent's guileful letter, the "only 'condition' under which we publish gelatine prints, is that the subject seem to us one upon which it is worth while to spend so much money as the gelatine process requires."

We can only guess at what the "sharp criticism" of Western men has been. Is it because the printed matter is of inferior quality, of indifferent interest, of no practical value, the discussions illogical, and the advice injudicious? Is it because Boston book-makers prefer to use uncleaved paper? Is it that our building items are incorrect? Or is it the character of the illustrations that is to blame, and do Western architects feel that they and their work are neglected? If this is the matter, whose fault is it? How many of the complainants (if there be such) have offered drawings and had them declined? And how can we, sitting at our desks in Boston, know the character of the work done in places eight or nine hundred miles away, and, knowing, take steps to get it? That the architects named above are not nowadays represented oftener in our pages is a fact that we regret more than he does, but it is owing to the architects themselves, not to any lack of urgency on our part. If the men capable of the best work choose to withhold it, and prefer to take the part of fault-finder and scorner because better work is not shown, it is they, and not we, who make it impossible to achieve better results. There is no architect in the country, however unknown to us, even our bitterest personal enemy (if we have one), who stands the least chance of having a creditable presentation of a good piece of design rejected by us when offered for publication; but as to whether a given drawing is a creditable presentation of good architecture, we, in the nature of things, must be the judge, and not the contributor. We have not the least misgiving that we have not made the best selection from the material that has been offered. We have corresponded with the editors of some of the English papers, who declare that it is impossible for them to understand the apathy of the profession in this country in the matter of giving support to the technical journals.

As to the other points,—and we are really grateful to Westerner for bringing these matters to our attention and shall always value any similar criticism or suggestion from any source—we will reply briefly that we have considered the matter of anonymous criticism, and have gone even as far as Paris in search of the right man for the work. The question and answer column was tried years ago, but, as it only resulted in the editors manufacturing both question and answer, it died a natural death. As to the convention matter, the gentleman whom we expected to represent us could not attend and there was not time to make other arrangements.

If we, in these random remarks, have not answered the "sharp criticisms," we will make another attempt if any one chooses to put them into definite form. We honestly believe that the publication of the *American Architect* during the last dozen years, which have witnessed the amazing growth of architecture in this country, has done more to make it possible for architects to find appreciative clients than any other cause that has combined to the same result, and we as honestly believe that we have not received the reciprocal support and consequent benefit that could properly have been anticipated by us and should have been extended by the profession.—Eds. American Architect.]

TO CUT A HIP-RAFTER.

Cleveland, Ohio, February 6, 1889.

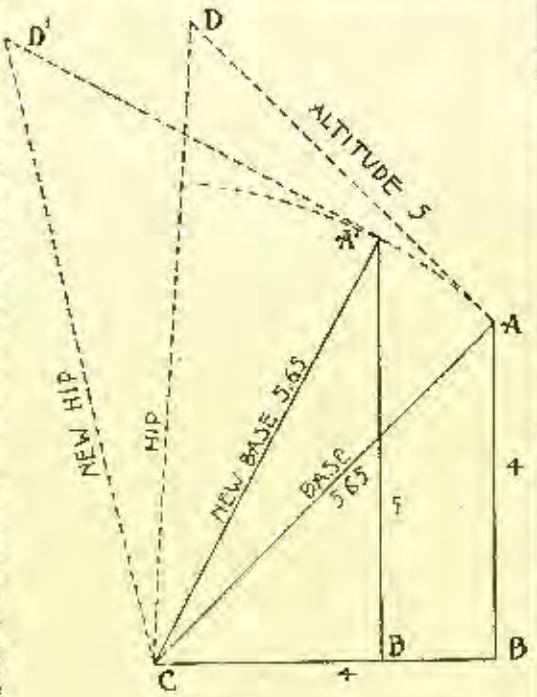
To the Editors of the American Architect:—

Dear Sirs,—I enclose the solution of a problem that I frequently come across in my work, thinking that it may be of use to some of your readers. The problem is this: Having in the main roof of a hip-roofed building a given pitch, and having a wing where it is impossible to give the roof the same pitch without destroying the masses of the roof, to make the pitch at the end of this wing such that the hip at the intersection of the two pitches of the wing shall have the same angle with the horizon as the hips of the main roof, and thus give the same apparent pitch to the eye.

The simplest way to solve the matter is by a sample problem as any other problem of like character can be solved in the same way.

Suppose the pitch of the main roof is 4 to 3; the plan of the hip

would give the ratio of 4 to 4 between its sides; then by squaring adding the squares and taking the square foot, the length of the hip as it would be shown on a roof plan would be 5.65 and the ratio of this line, the base, to the height of the hip would be as 5.65 is to 5. This is the slope that the eye sees. Now suppose that a roof of ½ pitch gives the proper relative mass to the wing, then a pitch at the end of the wing to give a hip with a ratio of 5.65 to 5 between its base and altitude must be determined. With one-half pitch the ratio may be called 5 to 5; then having a ratio of 5.65 to 5 between base and altitude of hips and the same ratio between base of hip and the one side of triangle forming plan, the other short side or base of new pitch desired is at once determined to be 2.6+. This gives a ratio of 2.6+ to 5 for the desired pitch for the end of wing. For a graphical solution lay off *A B* and *B C* at right angles, each equal to 4. The hypothenuse or base *A C*, then scales 5.65. Lay off altitude *A D* at right angles to this as 5. Then revolve triangle *A C D* around on the point *C* till *A' B'* parallel to *A B* scales 5 which give the ratios of 5 to 5 between *A' B'* and *A' D'* requisite for a ½ pitch. Then the desired base will be *C B'* which will scale 2.6+. The plan of the hips of the main roof being *A C* and the plan of the hip of wing being *A' C*.



Very respectfully yours, Clarence O. Abey.

THE UNIFORM BUILDING CONTRACT.

New York, February 20, 1889.

To the Editors of the American Architect:—

Dear Sirs,—In your issue of the 23d inst. you refer to some fragmentary newspaper report which had met your attention on the paper prepared by me and read by Mr. McArthur at the Convention of the National Association of Builders at Philadelphia, and quote what was there said with some expressions of alarm. I assure you that no such clause as the one quoted, or expressing that idea, can be found in the paper, and that, on the contrary, the views advanced are entirely in harmony with your own remarks on the subject.

The paper was prepared by me at the request of the President of the Association, Mr. John S. Stevens, of Philadelphia, and upon a subject suggested by him. I presume you will soon be placed in possession of copies of the papers read on the occasion, and can then make such comment as may occur to you with a somewhat clearer understanding of their contents.

The Association here referred to is one which should excite much interest among architects. It brings together at its conventions the principal builders of the United States, who are generally sent in delegations from local societies. Its form and methods correspond with those of the American Institute of Architects, and it promises to be a great power in regulating and elevating the building trades. The credit is due mainly to one of your townsmen, Mr. Wm. H. Sayward, the Secretary, for the enterprise and self-sacrificing exertions which have resulted in starting it on its useful and successful course. No one can doubt that it has a mission, and that the fulfilment of that mission will result in much good to all concerned.

With this Association, it is known, originated the idea of having all building contracts drawn out on blanks which are uniform for all work. By consultation and coöperation with the two great national associations of architects such a form was prepared, and, after being adopted by the three societies, it has been distributed for general use. And in regard to this uniform contract form, as might have been expected among architects who have been in the habit of using forms of a dissimilar construction, there are several clauses which do not meet with universal approval. Among these is that which makes the architect the *agent* of the owner, and which was so ably inquired into in an article in your last number.

The conclusion arrived at, however, in that article, that it is neither good policy nor good law to consider the architect as the agent of the owner, I think, from my observation, is not general among those who have examined and have used the form. It certainly is not so among those whose opinion I have heard expressed. A member of a firm of architects, who are engaged very extensively in business in this city, in Boston, and all over the country, stated to me that his firm liked the form very much. When I called his attention to the objection that had been made to the clause making the architect the agent of the owner, he said that this was one of the best features about it. In explanation, he said that they had once been prosecuted as principals by a contractor for work ordered by them as architects, and had had considerable difficulty in proving that they were acting simply as agents of the owner. If they had been so fortunate as to have had that clause here referred to in their contract-form, there would have been no ground for the suit, and there would have been not even a suspicion of their responsibility in the matter.

A friend has called my attention to the wording of a contract published twenty years ago, that has an instructive bearing upon the subject. He says that the view that the architect should be considered as the agent of the owner was held by no less a jurist than the late Theophilus Parsons, LL.D., Professor of Law in Harvard University, etc., who makes use of the same term in the form of contract, to be found in his "*Laws of Business*," published in 1860, which he entitles "A Full and Minute Building Contract." In this form he has provided that the work shall be done "under the superintendence of Mr. ——, who is hereby appointed superintendent and agent of the party of the second part"; that is, the owner.

In conclusion, it is believed that there is no good reason why uniform contract-blanks may not be used in building operations, and it is only by a comparison of views among those who are called on to study them that a universal concensus of opinion among architects may be evolved, and the custom be established of using a well-digested and generally-accepted form. Hence these discussions are not without their use. Very truly yours,

O. P. Hatfield.

THE WILLARD ARCHITECTURAL CASTS.

New York, N. Y., February 19, 1889

To the Editors of the American Architect:

Dear Sirs,—The article headed "New York," in your issue of Saturday last, invites attention to what I conceive to be the truth, that the comparatively slow growth in public recognition of the profession of architecture in America was inevitable under the adverse circumstances dominant in a new community, based largely on *bourgeois* and Puritan conditions, and centring itself mainly on the two platforms of sufficiently sharp trade, and not always overclean politics. This I have repeatedly urged in print during the last twenty-five years, while insisting on the greater necessity, *ipso facto*, of the profession first recognizing and clarifying itself, and then making use of "collective assertiveness" in its relations with the conscious and the much more frequent unconscious Philistinism of our environment.

The article is, in a number of other respects, timely, instructive and encouraging, and I share with you the belief that the recent and current work of the Institute and the Western Association toward the consolidation of all the architectural organizations in the national territory worthy of professional and fraternal affiliation, will "mark the close of the era of the struggle for existence and the opening of the new era of assured recognition."

I share, too, in your appreciation of the admirable work that has been accomplished by the Architectural League of New York, which, under the leadership of Mr. Russell Sturgis (whose long-volunteer labors did much to help the Metropolitan Museum of Art to its present position), is not likely to relax any of its energy and usefulness; but your correspondent perhaps does not remember what energetic protests were uttered nearly a quarter of a century ago by the Institute against the New York Post-Office and other ill-conducted public competitions; and, moreover, I feel well assured that the League could, in the future, do much more for the practice of all the fine arts, inclusive of and in architecture, if it were to reduce its methods somewhat to the lines suggested in a letter I wrote last summer to its able ex-President, Mr. John Beverley Robinson.

You also obviously recognize what seems to me indisputable, viz., that the work of the Willard Architectural Commission has already —though not much more than fairly started — added much to the encouraging outlook for the profession. Not only will the collection, when completed by the Commission, be a constant source of instruction and delectation to the laity, but it will be an inestimable boon to students entering on the practice of architecture. My esteemed friend, Professor Ware, has, within a few weeks, as a special committeeman on architectural casts (appointed with the eminent sculptor, J. Q. A. Ward, and another of the Museum Trustees, Mr. Rhinelander), supplied valuable assistance to the Commission's agent, Mr. Pierre L. Le Brun, in unpacking the cases so far consigned to the Commission, and in arranging their contents for re-articulation, and I tell the Professor that he and his students will reap more directly from the collection than all others put together.

Permit me, however, while cordially recognizing the appreciative spirit of your New York correspondent, to note two or three points in his communication which are somewhat misstated. Obviously, either Professor Ware is misquoted, or he was himself under a

misapprehension (as he very well might be from his quite recent participation in the matter) in the statement that it was the younger Mr. Le Brun (Pierre L.) alone who persuaded Mr. Willard to make his generous bequest. Mr. Pierre L. Le Brun, as modest as he is capable and faithful, would be the last person to make any such exclusive or even any major claim; while, too, his father, Mr. Napoleon Le Brun, the President of the Commission, would on the other hand, in the fulness of paternal feeling, be the last to protest against any mistake likely to redound to the credit of either of his sons, both of them once his pupils and now his partners, worthily continuing a name and reputation as much honored in the profession as they are in antecedents and general relations. I, therefore, as familiar with the circumstances of the case, but without the knowledge of either father or son, and simply in the interest of exact justice, speak for both as I do.

I must also say that Mr. Le Brun *fils*, is not a member of the Commission, as the communication in your columns states; though, as one of the best architectural archæologists in the country, he might, with extreme propriety be so, were it not for the fact that Mr. Willard preferred — as he solemnly made known in the posthumous letter he wrote to Mr. N. Le Brun which was published in your columns, in 1883 — that the son should act as the agent in Europe of a Commission to be appointed by the New York Chapter, A. I. A.; Mr. Willard's bequest being conditioned, however, on the father's being one of such Chapter members, while the choice and appointment of the other members — Mr. Littell and myself as it turned out — were left to the Chapter. The functions of Mr. Le Brun, the younger, consist, according to the will of Mr. Willard, in making selections and purchases "under the direction" of the Commission, that is, in selecting and listing architectural objects as alternates for the consideration and choice of the Commission; some of the most important of them — large models of buildings in their entirety — having been indicated to him near the beginning of the Commission's labors; while, none the less, large discretion has been left to him in the matter of detail examples, and in that of securing bargains not likely to recur, when time is not available for correspondence by mail.

Again, the Commission is not restricted to objects in plaster. The model of the Cathedral Church of Paris — Notre Dame — now being made for the Commission, will, for instance, have the row of kings (which all will remember as running the length of the principal *façade*) in metal; and to give an idea of the scale I may add that these figures will be seven inches high.

Finally, in the way of the correction of *errata*, let me mention that there had already been received at the Museum, when I attended the annual meeting of its incorporators a week ago (and a dozen other cases or so have since been received), more than double the number of cases your correspondent mentions, viz., 270 instead of 120; while their cost represents only about one-fifth of the fund. I will add that a personal inspection in recent years of the principal architectural collections in the museums of Europe — and some of them, more than once, has convinced me that before the end of our fund is reached, we shall already have secured a more valuable assortment of architectural examples than any single collection in Europe.

The collection of casts presented to the Museum in its first years by the President of the Institute, Mr. R. M. Hunt, will, moreover, be an addition to its whole architectural collection, interesting not only for its intrinsic art value, but as the first gift to the Museum in this department of the fine arts, while President H. G. Marquand's personal contribution of casts of the external and internal friezes of the Parthenon already forms the initial enrichment (on the face of the galleries) to the magnificent original hall in the Museum which has been assigned to the Willard collection.

But, when I look back to the first days of the Museum — twenty years ago — and recall (being, for a short time, jointly with Mr. S. P. Avery, its first Secretary) the answers from art connoisseurs and collectors which were received in response to requests for financial assistance and loans of art objects — all (with only one exception so far as I remember) conceived in sympathizing spirit, but almost all covering an evident tone of regretful distrust, and some of them quite outspoken in the belief that, however much it were to be wished, the time was very far off when it would not be mere waste to give time, strength and means to such aims in this country — when I remember this and look on the Wolfe collection of modern masters and the Marquand collection of old masters, the Cesnola collection, the bronzes, the marbles, the Egyptian and Assyrian antiquities, the jewels, the laces and the score of other fields of fine arts illustrated in the Museum, I feel that these first fruits of the Willard Commission's influence and labors, bought with Mr. Willard's money, will prove but the Alpha of what will later be gathered together, and which the architectural students of the next generation will have right at hand to study, and the public to enjoy; and that though our Parthenon and Cathedral of Paris, (the latter, as well as the former, now fast approaching completion under the daily supervision of Mons. Chipiez), and our Medinet Abou temple, now being negotiated for, will cost us thousands of dollars apiece (because Europe has nothing from which to duplicate them on the splendid scale we have ordered) the Metropolitan Museum will yet contain, in its new annexes, those equally ample models of the Taj Mehal, of St. Sophia, of St. Mark's, and the other and later representative cathedrals of Europe, as well as of the ancient edifices of Africa and of pre-Christian America which are on the Commission's lists. And not this alone: every great city of this country will have its own component and representative Chapter of the all-comprehensive Institute to originate its own architectural museum, largely made up, on interchangeable terms of courtesy and advantage, of duplicates of the models and minor examples now being acquired by the Willard Architectural Commission. Yours truly, A. J. Bloor.

ARCHITECTURAL DRAWING.

Richmond, Va., February 29, 1888.

To the Editors of the American Architect: —

Dear Sirs, — Will you be so kind as to inform me of a good work on Architectural Picture-making. If you do not publish such a book and know of one, please inform me. Hoping to hear from you shortly, I am yours respectfully, William C. West.

[*"Picture-making in Pen-and-Ink"* by Benjamin Linfoot, Philadelphia, Pa. — Eds. American Architect.]

TRADE SURVEY.

Business men everywhere have their attention riveted upon trade signs and indications in the hope of learning something that will indicate future probabilities. Among the numerous indications, favorable and unfavorable are these. On 23 per cent of the railroad earning capacity of the country last year, the net earnings were $23,826,990 less than for same mileage in 1887, and yet the gross earnings were the largest in our history. The public profited by the competition to this extent, and this is on the surface a matter of congratulation rather than regret. The loss in net earnings on the Trunk lines last year over 1887 was $6,798,861; Northwestern roads, $13,547,395; Southwestern, $4,504,664, and Southern roads, $178,650. January net earnings on 75 roads reporting show a net decrease over January, 1888, of $1,180,580. Notwithstanding these unfavorable returns new railroad work is seriously projected, and construction will begin in the Northwest on the opening of spring. Railroad interests are discounting the restoration of rates and the adjustments of all differences which have made such havoc for two or three years past. Great confidence is felt in the recuperative powers of the country, especially where railroad interests are concerned. Yet, the situation is not a comfortable one, and very competent authorities regret that there is so much occasion to fear the intervention of the strong arm of the Government by future supplemental legislation to bring some permanent harmony between the railroads and the manufacturing and shipping interests. As pointed out months ago the crop of speculative ventures is on the increase. The pig-iron storage scheme is under consideration, and has warm supporters and warm opponents. It would naturally stimulate the production of the more or less unsalable brands of pig-iron. The iron trade is feeling its way along carefully, afraid of accumulation and lower prices. Consumers are waiting for business to come before they buy largely. The most interesting features in the iron trade are the enlarging ship-building demand. The rail-makers are in a bad way, and unremunerative prices are accepted by a few makers rather than shut down. The smaller industries are gathering business slowly; carriage and wagon-makers, implement manufacturers, wood-working-machinery makers, founders, shelf-hardware manufacturers, architectural-iron makers are nearly all running practically full time, though there is not much work ahead. Shingle manufacturers report stocks light in the West, and prices have been marked up by some concerns. Manufacturers of building material have been feeling their way along with unusual caution, and the consequence is to-day that stocks are light and new contracts are made at strong but not high prices for brick, cement, stone, hardwood, glass, etc. Builders have confidence that all probable requirements will be readily covered this year, and hence there is no general anticipation of waits.

Architects in the Middle and Western States are not as a rule busy. A good many builders in the larger cities have not as yet been engaged to do summer work. A spirit of delay is manifest in many quarters. A question has been raised in some quarters if small house building is not in danger of being overdone. But the possibility does not check enterprise. Reports this week from New York architects show that fully twenty-five per cent more work is on the boards for February than for that month last year. At Philadelphia the architects have comparatively little work in hand, but the builders have been engaged to push small house building as usual. At Pittsburgh new work promises well but is not yet in hand. At Cleveland, Toledo, Columbus and Cincinnati new work is coming along and the architects who control work in these cities have about the usual amount of work on the boards. The same unfavorable comments are being made on the revenue laws of the State of Ohio, which it is alleged tends to drive capitalists with their capital out of the State. Enterprises connected with the development of natural-gas and oil and their utilization are forging ahead, although in Western Pennsylvania, and notably at Pittsburgh, deep and wide-spread complaints are being made by large manufacturing consumers over the monopoly charges made for fuel gas. The control of natural-gas territory and of facilities and means of transportation are generally drifting into centralized control, to the discouragement of those who for years past have been counting so much on cheap gas and the position it secured in the manufacturing world, to its possessors. The problem of substituting artificial fuel for raw fuel is receiving the most earnest attention from process men and manufacturers, and while definite results have not been reached, the difficulties have been greatly reduced in number and a very general adoption of artificial fuel in large and small manufacturing establishments is only a question of time. The slow progress is largely due to the backwardness of steam users. There are excellent systems to-day deserving of recognition which must drag on and wait for the tardy practical men to accept. The Siemen's furnace process had to be practically given away until its vast advantages became apparent. And so of many other mechanical advantages. Cities and towns East, West and South, will be large contractors for gas, water and electric-light equipments. Upwards of one hundred artesian wells will be started West and South in the next sixty days. One authority says one thousand shops, foundries, saw and planing mills will be erected in twelve Southern States in the next four months. Whether an exaggeration or not the facts all go to show that there is an unprecedented industrial activity in the sections mentioned, and that capital finds attractive opportunities for safe investment.

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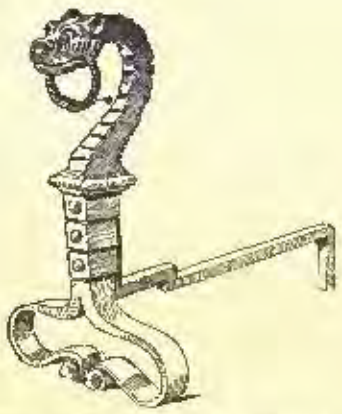
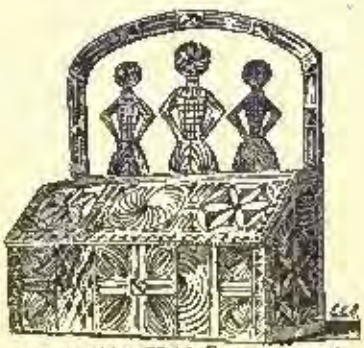
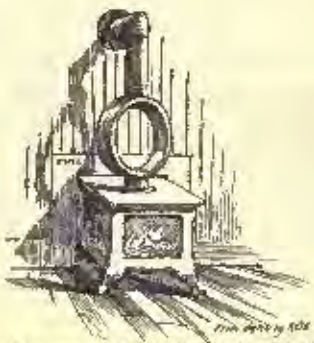


Fire-dog



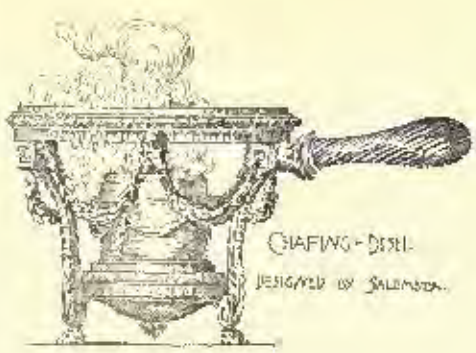
Old English Knife Box, brought over in the May-Flower, from Collection of the late N. E. G. Shaw, N. Bedford, Mass.



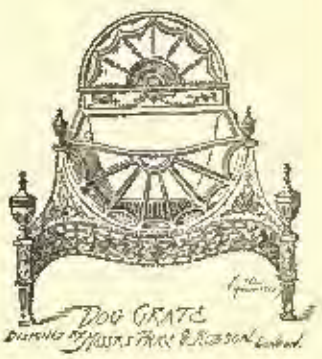
Curious old Stove, Dudswell, Que.

Fire-dog designed by Moreau Frères

Fire-dog designed by Moreau Frères



Chafing-Dish designed by Salembier



Dog Grate

FIRE UTENSILS.

The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Ticknor & Company, Boston, Mass. No. 689.

March 9, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE annual report of the Supervising Architect, the advance sheets of which have reached us, is an unusually interesting public document. Taken as a whole, it fully confirms the idea which we had derived from the reports of the recent investigation into the conduct of his office, that the present Supervising Architect had incurred the unfavorable criticism of outsiders mainly through the efforts, praiseworthy in a private citizen, but unpardonable in a public official, which he had made to promote expedition and economy in administration. We cannot say that we approve of some of the economies effected, the reduction in the cost of designs and specifications, while involving, probably, no practical disadvantage, having the serious æsthetic objection of tending to aggravate in the highest degree the commonplace, monotonous and ill-studied character which has been so long the reproach of our official architecture; but the mere existence of the office is a standing defiance to æsthetic considerations, and Colonel Freret is certainly not at fault in endeavoring to administer the business entrusted to him as efficiently as possible, and in something the spirit in which those who founded the office intended that it should be carried on. Aside from this, however, many really useless extravagances have been stopped, and the very tangible saving of three hundred and thirty dollars a day effected in the expenses of the office. Nevertheless, the advantage to the public of real architectural service, as distinguished from routine construction, has not been forgotten, and Colonel Freret proposes that designs for at least some of the public buildings shall hereafter be secured by competition. In regard, also, to the local supervision of the public building work, he strongly urges that the superintendence of such work should be given to properly qualified architects, residing in the locality, who should furnish their own assistants and clerical work, and should be paid by a fixed commission on the cost of the building erected under their care; the commission which he proposes varying from five per cent, where the cost does not exceed two hundred and fifty thousand dollars, to two and one-half per cent, where the cost is more than five hundred thousand dollars.

IN regard to the matters of procuring sites for buildings, and employing outside assistance in preparing drawings, the Supervising Architect gives explanations which agree with those made before the Investigating Committee, and, it need not be said, could hardly be otherwise than satisfactory to any one familiar with such work. Entering, however, more into detail, he gives some rather curious statistics of the cost to the Government of draughtsmen's work, both within and outside of the office. From these, which are taken from the records of the office, it appears that the amount paid for the services of the draughtsmen in the office in preparing the drawings of the United States Court-house at Lynchburg, Va., a building which cost nearly one hundred and thirty-five thousand dollars, was forty-six hundred and thirty-one dollars, or three and four-tenths per cent on the cost of the building. The draughtsmen's work on the plans for the Court-house at Fort Wayne, which cost two hundred and thirty-one thousand dollars, amounted to three per cent, and on the Quincy Court-house, which cost one hundred and eighty thousand dollars, to two and nine-tenths per cent, on the cost. The amounts thus quoted as paid for draughtsmen's services include nothing for tracing, photographic duplication, clerical work, or the salary of the Supervising Architect, or the services of experts, and, of course, nothing for local superintendence; and the cost of the buildings on which the percentage assigned to draughtsmen's work is calculated is the total amount of the appropriations, including all extras of every kind, and the cost of the site. In many cases this was probably as much as that of the building itself, so that the real percentage of cost of draughtsmen's services to that of the buildings was probably nearer four or five per cent than the two and two-tenths per cent which Colonel Freret finds to be the average for a long list of cases, selected at random from the office books, and covering buildings ranging in cost from fifty-five to four hundred and twenty-two thousand dollars. As an illustration of the great expense of making drawings in the Government office, he mentions also that the working-drawings for the heating apparatus alone for seven buildings, made in the years 1882 to 1884, cost the Government twenty-seven thousand nine hundred dollars. These facts are brought forward in the present instance to show only the saving which was effected by the letting of contracts to outside architects for the preparation of drawings, which so shocked and grieved the New York *Tribune* and some other Republican newspapers, but perhaps the new American Institute of Architects may do well to make a note of them, and when the time comes for presenting to Congress that unanswerable appeal, which is some time to be made, in favor of having our public architecture carried on as it is among all other civilized nations, it will find abundant material for supporting its argument in the archives from which Colonel Freret has quoted.

A CASE involving several points of interest to builders and architects was decided by the Supreme Court of California recently. A Frenchman named Monnier entered into a contract with a builder named Harding to construct for him a house. The contract provided that the building should be erected under the supervision of a certain architect, and that payments should be made on his certificate; and the firm of Renton, Holmes & Co. undertook to assist the builder by procuring bonds for him, and in other ways giving him financial support. Before the first certificate was given, Renton, Holmes & Co., feeling nervous about their money, obtained from the builder an assignment of his payments under the contract, and notice of the assignment, with a direction to deliver certificates to the assignees, and not to the builder, was given to the architect. At the same time, a man was sent to Monnier with a copy of the assignment, which he read to Monnier and showed him, asking him to sign it. Monnier declined to sign the paper, and told the man that he was a Frenchman and did not read or understand English, and asked him to come again when his clerk was in. Before any further notice was given Harding went to the architect, who gave him a certificate that payment of a thousand dollars was due, and Harding went with it to Monnier, who paid him the money. Renton, Holmes & Co., after trying unsuccessfully to get him to hand it over to them, sued Monnier for it, on the ground that he had sufficient notice of the assignment, and was bound to keep the money for them. The notice, they claimed, was given in two ways: once directly to him, and, secondly, through the medium of the architect, who, they claimed, was Monnier's agent, so that notice to him was constructively notice to his principal. On this point the court held that under the contract the architect was expressly authorized to see that the building was constructed in a good,

substantial and workmanlike manner, according to the plans and specifications; to sign and issue certificates that the work had been done in a faithful manner and to his satisfaction; and to decide any dispute that might arise respecting the true intent or meaning of the drawings or specifications. These were all the powers delegated to the architect by the contract, as the plaintiffs were aware, and the matter of making the payments, or of deciding how, when, or to whom they should be made, was not included in those powers, and, under the contract, in no way concerned the architect, so that the notice given to him was not notice regarding or connected with the subject-matter of his agency, and was, therefore, not properly constructive notice to his principal. As to whether notice given to Mounier, in a language that he did not understand, was such notice as the law required, the court held that it was "evidently not," and ordered judgment for the defendant.

THE reports of the Factory Mutual Insurance Companies for 1888 contain the usual amount of interesting matter. As might be expected, the statistics of the year's business show that the continued investigations of the principles of fire-resisting construction made by the officers of the companies, and their steady influence in getting these principles adopted, have led to a constant decrease in the cost of mill insurance, and a saving of property which, for the ten years which have elapsed since the companies began to try to influence construction, is estimated at five million dollars. It is fortunate that, as mill-construction is brought more and more into conformity with the rules now laid down, the investigation of the causes and results of fires becomes easier and more accurate, so that compliance with the rules as they stand furnishes the best means for promoting improvement in them. At present, the observation of mill fires is very accurate and extensive. During 1888, two hundred and ten fires were reported upon, the causes ascertained or inferred, the loss estimated, and all the circumstances of their origin, spread and extinction described so far as they were known. Of the causes of fire in mills, friction or foreign matters in the machinery is by far the most common, fifty-four out of the two hundred and ten fires of the year having been due to this. Next comes spontaneous combustion, which was responsible for forty-three fires, and next hot journals, which caused twenty. Four fires during the year were caused by steam-pipes. Of the appliances for putting out such fires, the most efficient by far are the automatic sprinklers, which played an important part in the extinction of nearly all the conflagrations that were finally subdued. Next to the automatic sprinklers, pails of water proved the most efficient instruments for the purpose. In very few cases was the loss more than a few hundred dollars, although in two instances cotton, blazing from friction or spontaneous combustion, was thrown by the machinery into bins containing ten to twenty thousand pounds of loose cotton fresh from the bale. In fact, the experience of the year, even more than that of the previous one, shows how much more to be relied upon these simple appliances are than the more ambitious apparatus of steam-pumps, engines and hose. In one case, where both a steam-pump and a rotary-pump had been provided, and were put in operation on the breaking-out of the fire, it was observed that they did not succeed in throwing any water on the fire, and, on investigation, it turned out that the valves were turned different ways, so that one pump raised water vigorously into the other, which as vigorously drove it back to its source. On readjusting the valves the water began to go where it was wanted, but by that time the fire had gained serious headway. Another weak point in the fire-service of many mills was rather unexpectedly brought to the attention of the insurance officials. There seemed to be a question whether the hose provided for the mills was in all cases what it should be, and a special agent was deputed to investigate the matter. On testing some nice-looking hose at certain factories, he found that more water leaked out of the hose on its way to the nozzle than escaped through the nozzle; and he learned further that "linen" hose could be bought for less than the cost of the flax of which it was supposed to be made. On making inquiries of dealers as to prices and quality of the hose they sold, he was asked in several places whether he wanted the hose for use or to pass the insurance inspector's examination, the requirements for those two objects being apparently very different in a dealer's eyes. As the bad hose is sold for about one-fourth the price of a serviceable article, one can see the dealer's interest in keeping it, but it is disgraceful that where a mill-superintendent asks for the best quality, and pays for it, he should have such rubbish palmed off on him. The hose investigation is to be continued, and will probably furnish valuable material for the next report.

THE Society of Swiss Architects and Engineers has adopted a new tariff of charges, somewhat similar in its classification to the German schedule which we described not long ago, but shorter. So far as the architects are concerned, the structures with which they deal are divided into three classes. The first class comprises rural buildings, factories, warehouses, workmen's barracks and simple school-buildings, without attempt at artistic treatment. The second class includes dwelling-houses and their dependances, hotels and boarding-houses, all public establishments, railway-stations and similar buildings; and the third class comprises interior and exterior decorations, furniture, monuments, fountains, and other objects of the kind. For designing and superintending constructions of the first class, architects are paid a commission varying from five per cent, where the cost is from two to five thousand dollars, to three and one-half per cent, where the cost exceeds one hundred thousand dollars. As stables or simple school-buildings costing more than a hundred thousand dollars must be rare, even in Switzerland, this seems to amount practically to a rate of about five per cent for all such constructions costing over two thousand dollars, and a higher rate for cheaper ones. For buildings of the second class, which must include much the largest part of the architect's work, the commission varies from six per cent, for those costing between two and five thousand dollars, to four and one-half per cent, where the cost exceeds one hundred thousand. This commission, however, does not cover services in regard to the decoration of the house. These come under the third class, for which the commission varies from six per cent, where the cost is more than one hundred thousand dollars, to ten per cent, where it is between two and five thousand. In all cases where special supervision is desirable a clerk-of-works is to be employed, and paid by the client, and where a clerk-of-works is not employed the client must pay for measuring up work, for verifying the builder's accounts, and similar service, independent of the architect's commission. All travelling expenses incurred by the architect in connection with the work, whether in supervision or other service, are to be repaid in full, and in addition to these he is allowed in all cases, beyond his commission, a fixed sum, or *frais de déplacement*, as compensation for being absent from his office, amounting to four dollars for each half-day, or six dollars for a whole day. The commission for work costing less than two thousand dollars, in any class, is to be fixed by special agreement, and where a design made by one architect is given to another to execute, which can only be done by consent of the former, the compensation of the second, for what he is called upon to do, must be increased by twenty per cent. The anomaly, common to sliding scales of charges, by which, for example, the commission on a ninety-eight-thousand-dollar building would be larger than on one costing a hundred and four thousand, is got over by providing that in all cases the commission shall be reckoned at the highest figure allotted to the class below, until a point is reached at which the fees, reckoned at the rate proper to the class, shall reach a sum in excess of that figure. Thus the same fee, nine hundred dollars, is charged on all buildings of the first class costing from twenty thousand dollars to twenty-two thousand five hundred. After this the fee becomes a larger sum, reckoned by the lower scale.

ONE of the most remarkable and satisfactory things about the Paris Exposition of 1889, which will open in a few weeks, is the precision with which the estimates have been followed in regard to the buildings. We are so accustomed to see the actual cost of buildings of this kind far exceed the estimates that it is surprising, as well as gratifying, to find that the palace for the exhibition of works of art and skilled manual labor cost seventy-eight thousand dollars, or six-and-one-half per cent, more than the original estimates; the Machinery Hall, which cost fifteen hundred thousand dollars, exceeded the estimates by only four per cent; and the remaining building, the Palace of Diverse Arts, exceeded the estimates by less than two per cent in a total of twelve hundred thousand dollars. The cost of the contingencies, moreover, has been much less than was anticipated, so that the net result, instead of an enormous excess of cost over the estimates, shows a balance of six hundred and fifty thousand dollars which will not be needed.

BUILDERS' HARDWARE.[1]—XX.

ORDINARY LOCK AND LATCH.

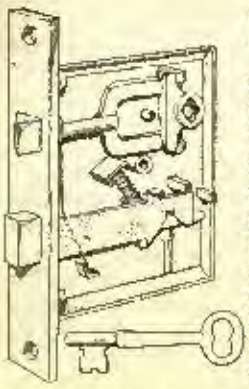

Fig. 304. Lock. P. & F. Corbin.

ONE of the cheapest locks in the market, and one which, considering the price, is a very fair article, is manufactured by P. & F. Corbin, Figure 304. Everything about this lock is of cast-iron except the springs. The single lever, shown by dotted lines under the bolt-tail, *A*, has a small shoulder instead of gatings, and the latch has only one steel spring. It is a lock that offers no real security, but it is worth all it costs, $1.50 per dozen. It works easily, and is so simple in construction that it seems capable of withstanding considerable wear, perhaps more than a better article. Figure 305 is a more expensive, one-lever lock by the same manufacturers, having double springs for the latch. The form of follow, *A*, and the arrangement of springs in this example is that which has been found to give the best results, generally speaking, and which has been adapted to a great many varieties of locks. When the latch is forced back, upon closing the door, the lower spring alone is compressed, reacting against the plate and posts at *B*, but when the door-knob is turned in either direction the follow forces back one of the arms of *C*, compressing the upper spring, while a shoulder on the lower part of *C* catches on *D*, which is attached to the latch-bolt, thus bringing both springs into play. This would be termed an easy spring-latch, in that the knob can be turned with equal ease in either direction.

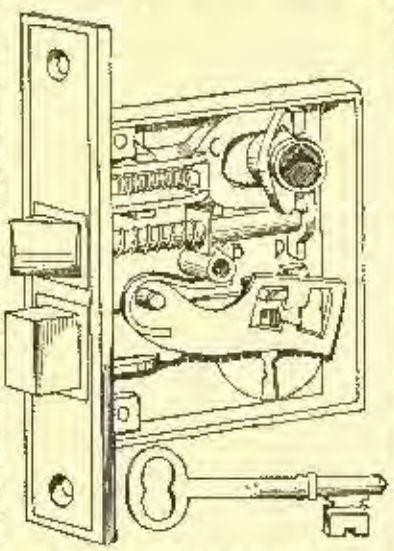

Fig. 305. Lock. P. & F. Corbin.

Figure 306 illustrates a lock manufactured by Nimick & Britton, in which the lever and bolt are essentially the same as in the preceding example, but which has a follow arranged upon a different principle, lugs being cast on the top and bottom so as to bear against the irregular spring-lever *A*, and the latch-bolt being pinned to an extension of the lever. The follow and lever shown in Figure 307, a lock by J. B. Shannon & Sons, is of much the same description. In both of these, the knob can be turned more easily to the left than to the right by reason of the unequal leverage against the piece *A*, though the difference in resistance is partially compensated for by making the shoulders on the follow of unequal lengths. The lock shown by the last figure has three levers, and is catalogued as being hand-made. In Figure 306 the latch is reversible so that the lock can answer for either a right or a left hand door.

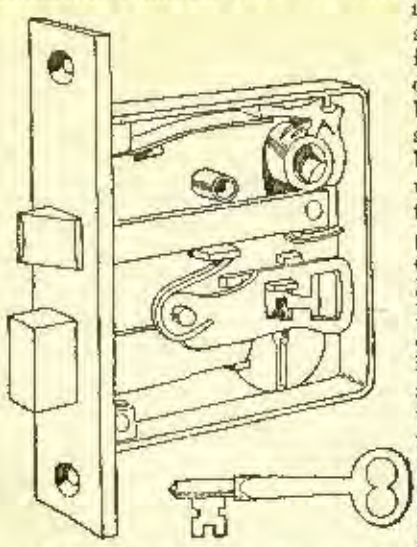

Fig. 306. Reversible Mortise Lock. Nimick & Britton Mfg. Co.

[1] Continued from page 87, No. 687.

The "Niles" locks, of which Figure 308 is a type, are all made to be operated by knobs having a follow cast solid onto the spindle. The action of the knob will be referred to later on. The figure shows only the follow, *A*, which is inserted from the back. The "Niles" locks have the name of wearing very well. The levers are of steel and are pretty well fitted, for a machine-made lock, and the springs are also of steel, the bolt being the only portion of the mechanism for which brass is employed. As in some of the previous examples, the knob turns more easily towards the left than the right. If instead of the irregular, hinged lever, *B*, a form were adopted similar to that shown in Figure 305, the "Niles" locks would leave little to be desired, and would compare favorably with anything else in the market.

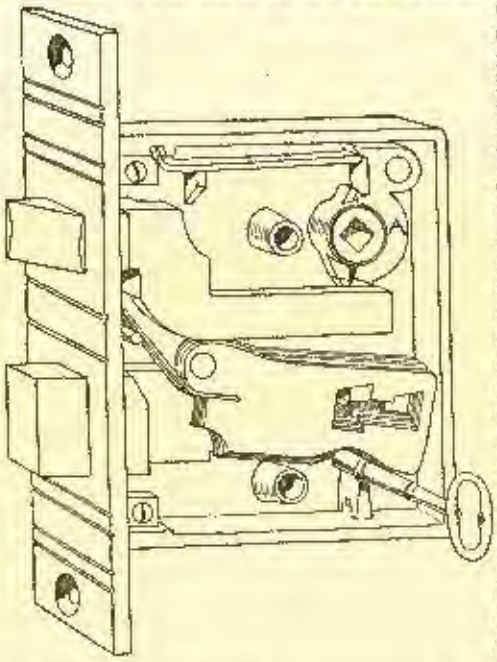

Fig. 307. Mortise Knob-Lock. J. B. Shannon & Sons.

An examination of the figures will show that, except in the very cheapest example, the face-plate of the lock is screwed to the lock-case in such a manner that it can be moved slightly and set at whatever bevel may be desired in order to fit the door. Figure 309 shows a lock of the Ireland Manufacturing Company in which all the parts can be reversed. The latch is

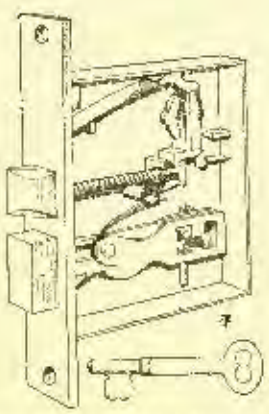

Fig. 308. Niles Lock. Chicago Hardware Co.

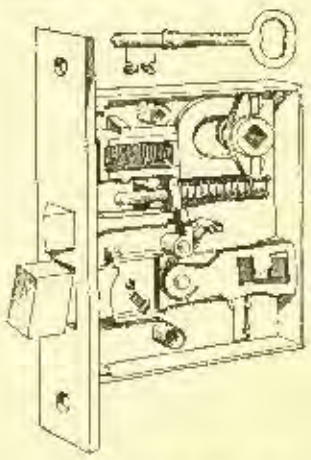

Fig. 309. Reversible Lock. Ireland Mfg. Co.

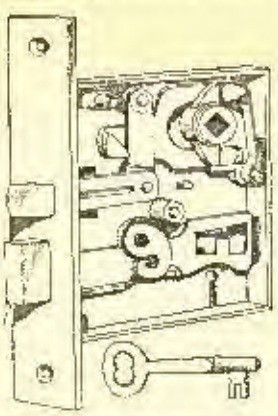

Fig. 310. Reversible Lock. Ireland Mfg. Co.

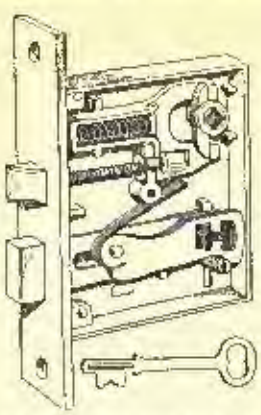

Fig. 311. Three-Lever Lock. Hopkins & Dickinson Mfg. Co.

simply drawn out and turned over. The bolt-tail is in two sections and the outer part can be unscrewed and reversed to match the change in bevel. Otherwise this lock is of the ordinary type. Figure 310 shows another lock manufactured by the same company, in which the hand can be changed by turning the latch over.

Figure 311 illustrates a very satisfactory three-lever lock made by the Hopkins & Dickinson Manufacturing Company.

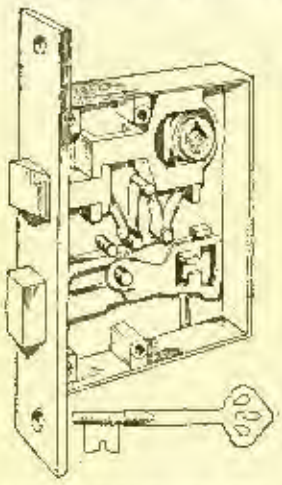

Fig. 312. Reversible Lock. Hopkins & Dickinson Mfg. Co.

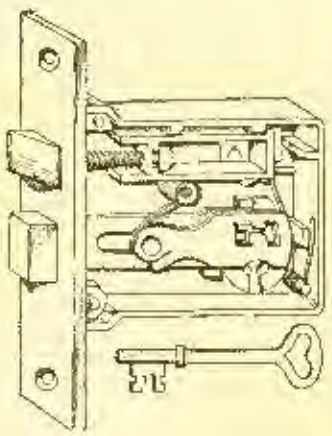

Fig. 313.

The key-hole in this example is protected by a small rotating curtain similar to those described in connection with the store-door locks, intended to aid in securing the levers from being tampered with. Figure 312 is another lock by the same company, in which the latch-springs are of phosphor-bronze, and

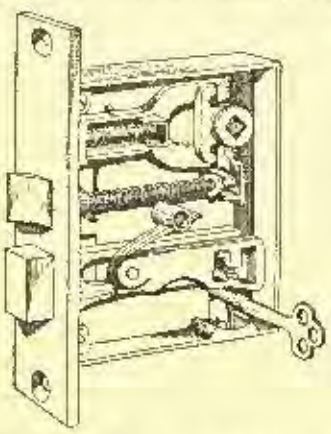

Fig. 314. Standard Lock. Yale & Towne Mfg. Co.

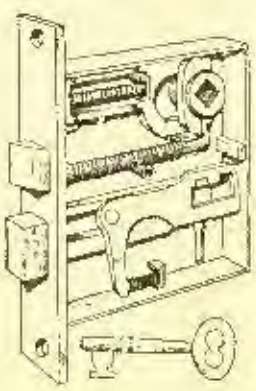

Fig. 315. Lock. Enoch Robinson.

quite ingeniously, though very simply arranged so as to give an easy spring-latch. The latch is reversible. The lock is shown with a single-lever, but is also made with three, if desired. Both of these locks are excellently finished.

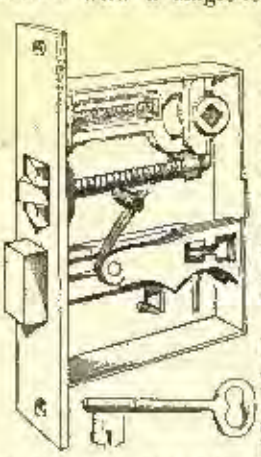

Fig. 316. Lock. Enoch Robinson.

Figure 313 shows a lock in which the latch is operated by a peculiar form of knob having no spindle or follow, but working against the latch mechanism with a lever at *A*. It has the same disadvantage as the "Niles" locks, that the ordinary form of knob and spindle cannot be used with it. Aside from the latch, this lock presents nothing out of the usual line.

Figure 314 is a type of a make of locks which for simplicity of design, carefulness of execution and for good lasting qualities is hardly excelled by anything in the market, except the best hand-made work. The Yale "Standard" locks, as they are termed, to distinguish them from the ordinary Yale pin locks, are made with steel levers, and brass springs, bolts and follows. They are so perfectly simple as to require no description. The best forms of springs, levers, and follows are used in these locks, so that they seldom fail to give satisfaction.

Excepting Figure 307, all of the foregoing locks are machine-made, the levers being hand-fitted only in the best grades. Figure 315 shows one of "Robinson's" cheapest hand-made locks costing $1.25 each, fitted with a single iron lever, bronze or brass being used only for the follow and the bolts. Figure 316 is a better example of Robinson's work, costing $3.50 per lock. In this the levers, as well as the bolts and the follow are of bronze, and the latch is fitted with an anti-friction strike. The interior of a machine-made lock usually is finer looking than that of one made by hand, as in the latter all the care is concentrated on the adjustment of the mechanism. There is no denying the excellence of the "Robinson" locks, at least it would be difficult to persuade many Boston builders that they are not the best to be had, and although the locks are much more expensive than the best of the Yale "Standards" or the Hopkins & Dickinson locks, they are used a great deal on all kinds of work. It is a satisfaction to know that there is one corner of this country where careful, conscientious work can command its own price, in the face of the competition which exists in the hardware trade.

(To be continued.)

AUGUSTE RODIN.[1]—V.

Figure belonging to the Door. A. Rodin, Sculptor.

AS Rodin had many pleasant memories of Belgium, he was very glad that "The Age of Brass" was sent in October, 1880, to an art exhibition at Ghent, in that country, by M. Turquet. While the sculptor was living in Belgium, he had exhibited in that city his bust of Dr. Thirlar, and had received for it, from J. Rousseau, a writer for *L'Echo du Parlement*, warm and intelligent appreciation.

The authorities of the Ghent exhibition had provided two gold medals to be given to exhibitors from other countries, and Rodin was one of them. The statue received an especial consideration from the pen of M. Camille Lemonnier, a distinguished Brussels art-writer. Some months after the exhibition there came to the sculptor's humble lodgings an elderly gentleman, who, when received by Mme. Rodin, appeared somewhat surprised at the simplicity of the surroundings that met his gaze. He asked if M. Rodin lived there, and was answered in the affirmative. "The sculptor?" "Yes." "Then," said he, "I have come to bring him something that I think will give him pleasure," and he unrolled from a carefully-prepared package a gold medal, and presented it to Mme. Rodin, expressing at the same time, in the most fatherly manner and familiar terms, his appreciation of the talents of her husband, his firm belief in the certainty of his future success, and the pleasure he enjoyed in performing the duty of bringing this medal, that had been given to the sculptor at the Ghent exhibition for his noble statue "The Age of Brass." "I think," says Rodin, "that this was the loveliest thing that ever happened to me. The gentleman was M. Rolin Jacquemyns, a former Belgian minister, who, by the way, was succeeded by his son. He spoke as though I had not yet succeeded, but should eventually, by reason of his good wishes and a little more work and patience."

[1] All rights reserved. Continued from page 101, No. 688.

In this same year the "St. John" and "The Broken Nose" were sent to an exhibition at Nice. There, also, the sculptor was awarded a gold medal, but under somewhat different conditions than at Ghent. The Nice authorities provided that those to whom such a distinguished recompense was given must pay for its cost. As Rodin had not then any money to spare for this purpose, he has not yet come into the possession of the Nice medal.

In the *Salon* of 1881, Rodin exhibited a plaster statue called "The Creation of Man" and the "St. John" in bronze, and received two votes for the Medal of Honor. In these exhibits, the press, for the first time, took a general, warm, and very decidedly varied interest. Of the first statue, hardly anything was said in favor, it being the subject of both ridicule and caricature. Here and there, a writer found something in it that caused him to pause, think, and finally conclude that its author was looking for some result quite outside of the usual track of sculpturesque expression. "If it displeases by its democratic style of treatment, we must accord to it a power and intensity of life that forces us to forget its lack of moderate idealism to which we are accustomed. We are forced to believe that this artist is destined to open a new route, a route in which he will not be without followers and admirers." "His 'Creation of Man' is worthy of all praise. Without doubt, it is a striking reminiscence of Michael Angelo, an intended exaggeration, an extravagant expression of nature: this time, M. Rodin cannot be accused of having made, as he was two years ago, his work from moulds taken from the living model. Besides, the proportions are well preserved, and the muscular rendering reveals solid anatomical knowledge. The artist who shows such a hardy work must really have, as they say, 'something in his stomach.' M. Rodin is evidently haunted by some philosophical preoccupation; he wishes to show, in inert matter, a life that is unveiling itself little by little; and he has given to this personage the dolorous expression of a man waking from a heavy sleep in order to enter into the sad reality of active life. It is, perhaps, too daring to try to express such complicated things in an art that is, above all, entirely material, but when an artist succeeds he is not to be reproached. In any case, a conscientious and valiant effort like this of M. Rodin's seems to me much more worthy of eulogy than the commonplace compositions that appear every year, stringing out before our eyes a mythology of conventionalism, a lying history of unsuccessful antiquity." The "St. John" was much less condemned and much more commended. "Another artist of high value, who receives no justice, is M. Rodin. His 'St. John' preaching is beautifully executed, though criticised because the shoulder-blade on the right side is not in its right place, and the action of the legs do not show that he is walking, nor the feet that he is in repose, because they are too far apart. But we salute it for its personal style, superb and biblic rusticity, and the frank and unconscious effect it produces. It is a magnificent and noble work that our sculptors will no doubt examine with great attention, if not learn a little from it." "The 'St. John,' by Rodin, is a powerful piece of modelling; the awkwardness, and, at the same time, the simplicity of this personage could not be better expressed. It is evident that the artist is inspired by a deep regard for nature, and is willingly carried along in the extreme study of his model. The head is beautiful in character."

In the autumn of this year the "St. John" was sent to Brussels and exhibited in the "Salon of Twenty." If anything, there was a more lively discussion of its merits in that city than there had been in Paris. Condemned for its "vulgar pose, gesture and expression," and praised as "an exceptional piece of modelling; a work of the first order, one of the most remarkable efforts of present-day sculpture."

In the *Salon* of 1882, Rodin exhibited two busts: one of the eminent painter, J. P. Laurens, in bronze, and the other of Carrier Belleuse, in terra-cotta. With hardly an exception, the first took the critics by storm, nothing being left unsaid in its favor, while the last was cordially admired for its workmanship, and the sculptor occasionally called to account for making a head of such passing interest. The critics seemed to have become aware that a new and different style of man was claiming their attention. The Laurens' bust was a projectile that produced a retrospective, as well as a prospective effect, and, in speaking of its merits, the occasion was very often used to make up for the neglect that had been shown in past years to the "St. John" and "The Age of Brass."

M. Foureaud wrote as follows in *Le Gaulois*: "Of all the young sculptors, I place this one (M. Auguste Rodin) the highest by a great deal. Last year, he exhibited a bronze statue of 'St. John, the Precursor,' old and thin, savage and nervous, and of an incomparable energy; this year he shows a bust of the painter, Jean Paul Laurens, nude shoulders, severe, proud, living, like a Gothic work of the strongest epoch. I have respect and a religious love for this expression of art integrity, powerfully and profoundly human. I expect from M. Rodin such masterpieces of robust individuality as will make everybody's eyes sparkle, and I count on him to make me prove that there is no such thing as modern sculpture outside of an intimate human expression, of typical movement, and of obstinate observation of the human body."

In the journal, *Exposition des Beaux-Arts*, M. Philippe Burty, wrote these observations: "That which M. Dubois seeks in physiognomy, M. Rodin looks for in character. His bust of M. Jean Paul Laurens is a very thrilling work. His manner of rendering form is rare in these times when every one comes from the same school where they have acquired nearly the same disposition not to learn from a close study of nature. There are many defects of taste in this composition. In spite of this, one feels that he faces a resolute artist, capable of rallying the young who feel how powerless academical eclecticism has left them in the face of the imperious need of the truth which the spirit of modern times requires. This doctrine, that they call naturalism, is that of which Rude and David d'Angers were high representatives." The question of Rodin deserving the Medal of Honor, had become a living one among his admirers, and the subject was canvassed in *L'Art*, in July, 1882, by M. Paul Leroi. He says: "What if the Medal of Honor is the least serious thing in the world, the question of art is the only thing that weighs, and this being true there can be but two competitors possible for the painting and the sculpture: M. Léon Lhermitte and M. Auguste Rodin, the sculptor of the portrait of M. J. P. Laurens, a bust that does honor to the greatest masters of all times. There is but one name to give to it, that of masterpiece. Look out for Rodin. He is going a long way."

During the year 1882, Rodin exhibited in four different cities, London, Vienna, Pau and Paris. In the first city he sent to the Grosvenor Gallery "The Broken Nose," and the "St. John" to the Royal Academy. His name had already reached London through the newspaper and art-journal correspondents, and generally with an intelligent appreciation of the superior qualities of his work, the principal exception being Mr. Edmund Gosse, the eminent writer and critic, who kindly suggested "the tempered sobriety" with which he would like to have M. Rodin handle the modelling tool. Mr. Gosse disliked the very qualities that the French writers hailed with the liveliest satisfaction, and is the only critic, out of the dozens that spoke of the sculptor, for or against, that presumed to advise him in regard to what sculpture was. As a general thing these two exhibits were received in London with the heartiest appreciation. A most enthusiastic notice of them was written by Arthur Warren, to the Boston *Transcript*.

When the Vienna exhibition took place, Rodin requested the Committee of the French Government to include in the list of selected works the two statues he had sold to the State. They were sent to Vienna, but so badly placed, that the newspapers from every country, included in their commendation of the figures a protest against the unworthy treatment they had thus received.

The exhibition in Paris, above alluded to, was called the Triennial *Salon*, and in it were shown the bronze copies of "The Age of Brass" and the "St. John," for the first time together in that city. Though badly placed, as usual, they became the objects of the most enthusiastic and general praise. The unique qualities of the statues were distinctly noticed, and their author often mentioned in connection with Donatello and Michael Angelo. As a whole, Rodin was set apart squarely and intelligently as representing, with one or two other sculptors, the highest note of French sculpture. For originality of workmanship, living interpretation of nature, and profound and scientific understanding of the human form, he was declared to be the greatest living representative. At the close of this exhibition the "The Age of Brass" was erected in the garden of the Luxembourg. Rodin was now fast becoming a recognized element in art in his native city. The striking and original character of his work was affecting serious minds in literature and art. He was making friends among the best people in these professions. His exhibits in the *Salon* of 1883, consisted of a bronze bust of Daniell, and one of A. Legros, a distinguished French artist and friend of the sculptor, living in London. They were spoken of with the warm accord given to his previous busts. Those of Laurens and Legros were shown in the Antwerp *Salon*, and were received with the same admiration that had been given to them in Paris. Besides several exhibitions of his busts, including one of Manon Lescant and the "Petite Alsacienne," in various places, Rodin, in company with a number of French painters, made one in London, at Egyptian Hall. His list comprised seven works, the plaster statue of "St. John," a figure of "Eve after the Fall," half life-size, "The Broken Nose," busts of Laurens, Legros and the "Petite Alsacienne," and a little group in bronze called "The Children's Kiss." By all the London writers these works were regarded as the most striking part of the exhibition, and the point chiefly made was the varied capacity shown by the sculptor. Some then asserted that Rodin was not only greater than any other French sculptor, but the greatest one in the world.

The exhibition was not a pecuniary success, but it served to make for Rodin an excellent London reputation.

To the *Salon* of 1884, the sculptor sent a bronze bust of Victor Hugo, and a plaster one of the distinguished sculptor, Jules Dalou. The former was cast by the wax-process, as had been the bust of Laurens, and this incident was noticed, not only as indicating the care the sculptor took in the reproduction of his modelling, but as an opportunity to pay a deserved tribute to the founder, Gonon. With rare exceptions these busts were welcomed by the press with increased acclamations of praise. The Paris correspondent of the London *Daily News* referred to them as the work of the man who was greater than any sculptor living, mentioning other Frenchmen who were popularly regarded as the greatest, "because he had more to say, and sees farther into life and art." Both busts were afterwards shown in Brussels and London.

The art-lovers and critics of Paris, London, Brussels, Antwerp, Pau, Nice, Ghent and Caen, had seen during the past four years all the works that Rodin had thus far exhibited. It is safe to say that no other sculptor of modern times had produced so strong and varied

an impression, and been received with more admiration by the most intelligent and liberal representatives of those two classes. The only serious antagonism that the sculptor had aroused was in his own country. That had not diminished, nor was it likely to, for it was based on a natural temperament as strong as that which was seen in Rodin's statues. The history of the Hugo bust is an interesting one. Sometime in 1883, M. Edmond Bazire, one of the editors of the Paris journal, *L'Intransigéant*, and an ardent friend of Rodin, and who wished to have him make a bust of the poet, went with him to see Hugo to consult about it and arrange for some sittings. Unfortunately, the latter had just completed giving a wearisome number of hours for the same purpose to another sculptor, and he did not feel disposed to begin again. But a member of Hugo's family, who was not pleased with the bust, was very desirous that Rodin should at least make an attempt in some way, and as a preliminary step he was cordially invited to come to Hugo's house every Sunday evening, dine, and study his subject as best he could.

After a number of these agreeable visits the sculptor brought his modelling stand and clay, established himself out-of-the-way, in one corner of the veranda, and began his work, without in any way disturbing or expecting the poet to pose expressly for him. The bust was practically made from memory, the sculptor first looking at Hugo, wherever he might be, and then returning to his clay and working out the result of his observation, losing, of course, much that he had seen and been impressed with, in going from the subject to his work. It was a difficult and almost endless task, and the bust was only completed about six months before Hugo's death. By many of the poet's friends it was, at first, regarded as a complete failure, but time gradually developed its merits, and those who at first disliked it became its enthusiastic admirers. Rodin made two wax-process bronze copies, giving one to the Hugo family and retaining the other for himself.

To assist him in modelling the bust the sculptor had made many sketches, on paper, of his unwilling sitter from every possible point-of-view.

Soon after Hugo's death, an iron merchant of Besançon, commissioned M. Sagot, a Paris dealer in art and rare books, to buy everything that he could find in any way connected with the poet. As the distinguished qualities of Rodin's bust had become well known to M. Sagot, he went to the sculptor to get a copy of it, and while there he learned of the existence of these drawings. The result was that both bust and drawings, eighty in all, went into the possession of the Besançon collector. As fate would have it, in a few years, this admirer of the poet met with pecuniary reverses, and the bust, with other objects, was advertised to be sold at auction in the city of Lyons. M. Sagot hastened to the sale, and to the comfort of his pocket, as well as his surprise at the narrow geographical range of familiarity with Hugo's physiognomy, he found that no one knew whom the bust represented, nor saw its merits as an art production. He bought the bust for ten dollars. The drawings have disappeared, and not all of M. Sagot's perseverance and enterprise have been able to find them.

Rodin also made two etchings of Hugo's portrait from these drawings. Several bronze copies of the bust have been sold, and the Paris Society of the Men of Letters has a plaster copy. Not long ago the city of Paris ordered a marble copy.

It need hardly be said that Rodin's social and professional relations with Hugo were of the most agreeable description. At his table the sculptor met the most distinguished persons in Paris. Here are some of his observations: "Hugo had the air of a Hercules; belonged to a great race. Something of a tiger, or an old lion. He had an immense animal nature. His eyes were especially beautiful, and the most striking thing about him. As a man he was large and agreeable, no personal pride. When he showed pride it was outside of himself. He always had twelve or fourteen guests at his table, and being somewhat deaf he heard little of the conversation, but often in the very midst of it he would break out with some astonishing observation. It was not until two or three years after his death that I really saw the man, the amplitude of his character, and felt the force of his private work and impersonal nature."

T. H. Bartlett.

[To be continued.]

THE ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

DOORWAY TO HOUSE OF JOHN PEABODY, ESQ., MARLBOROUGH ST., BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine print, issued only with the Imperial Edition.]

SKETCH FOR A MEMORIAL LIBRARY, LEXINGTON, KY., BY MR. WILLIS POLK.

STORE BUILDING FOR MAJ. J. F. H. PRITTS AND MRS. R. R. WALLACE, ST. LOUIS, MO. MR. A. F. ROSENHEIM, ARCHITECT, ST. LOUIS, MO.

THE building has a frontage of 70 feet by depth of 65 feet, is 6 stories and basement high and is to be used for wholesale business purposes. The first 2 stories are carried up in Portage Entry and Marquette (Lake Superior) red and brown sandstone alternating, in courses crandled and quarry faced. The upper 4 stories are carried up in brown brick of chocolate color for facing, and Portage Entry red stone for trimmings, the effect being uncommonly good, and the unusually deep reveals at windows being very effective. The interior construction is what is called slow-burning or mill construction, girders composed of 2 pieces 8" x 10" Georgia pine bolted together at regular intervals and these carry, on wrought-iron stirrups, cross beams 6" x 12", anchored thoroughly to said girders at intersections. At right angles to these beams and on top of same is laid a 3" yellow pine tongued-and-grooved flooring, and again on top of this and in the opposite direction a 1⅛" maple flooring, the whole making an exceedingly stiff and rigid floor. Iron columns throughout fireproofed and plastered. Plate-glass, hydraulic elevators, electric-lighting, and in short all modern conveniences and appliances. Total cost $100,000. To be completed about May 1, 1889.

VENTILATING TOWER FOR THE PRESBYTERIAN HOSPITAL, MADISON AVE., NEW YORK, N. Y. MESSRS. J. C. CADY & CO., ARCHITECTS, NEW YORK, N. Y.

THIS is one of a series of buildings now erecting for the Presbyterian Hospital. It was recently completed. The tower forms the main exhaust shaft for the system of ventilation, which is connected to all the buildings by means of large underground ducts which when completed will cover an entire block. The rest of this building is used for dispensary purposes, excepting the cellar, in which are located the fans and other machinery necessary for driving the ventilating apparatus.

SKETCH FOR STABLE AND BILLIARD-ROOM, PELHAM, N. Y. MESSRS. WALGROVE & ISHAELS, ARCHITECTS, NEW YORK, N. Y.

BUILDING is to be entirely covered with shingles and billiard-room to be finished in yellow pine; to have all improvements and to cost about $3,000.

BUSTS OF VICTOR HUGO, DALOU, ROCHEFORT, LEGROS AND LAQUENS. M. AUGUSTE RODIN, SCULPTOR.

See article elsewhere in this issue.

COTTAGE NO. 4, WATCH-HILL, R. I. MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

HOUSE FOR MRS. ALICE BACON, LOUISVILLE, KY. MR. C. J. CLARKE, ARCHITECT, LOUISVILLE, KY.

HOUSE OF ALEXANDER UEE, ESQ., TORONTO, CANADA. MESSRS. KNOX & ELLIOTT, ARCHITECTS, TORONTO, CANADA.

THE POPP COMPRESSED AIR SYSTEM IN PARIS.

EVERY visitor to Paris has noticed the pneumatic clocks which stand at the corners of the streets, and in the rooms of the principal hotels and public buildings. When indoors, they attract attention by the absence of the ordinary ticking, which is replaced by an unusual click, occurring every minute. If the mechanism of one of these clocks be investigated, it is found to be exceedingly simple, the principal part being a small cylinder with a piston. This cylinder is connected by a small flexible tube with a network of fixed pipes running through the building, and these are again coupled to a main in the street. Every minute a wave of pressure circulates through the entire system of pipes, and the hands of all the clocks make an advance. There are an immense number of these clocks in Paris, the total on October 31 of last year being 7,800. Their installation has been greatly facilitated by the system of so-called sewers which exist in the city, for the main pipes can be laid in these without breaking the streets. It would be more correct, according to English ideas, to denominate these underground conduits as subways, for they consist of passages having a drain in the centre, with a footpath at each side, and ample head room for a man to walk through. Even the liquid flowing through the drain is much less foul than ordinary sewage, owing to the prevalent use of cesspools.

The notification of time by means of compressed air was begun in 1870 by the Compagnie Générale des Horologes et Forces Pneumatiques. In 1880, the company, which then underwent reconstruction, enlarged its sphere of action, and obtained a concession for forty

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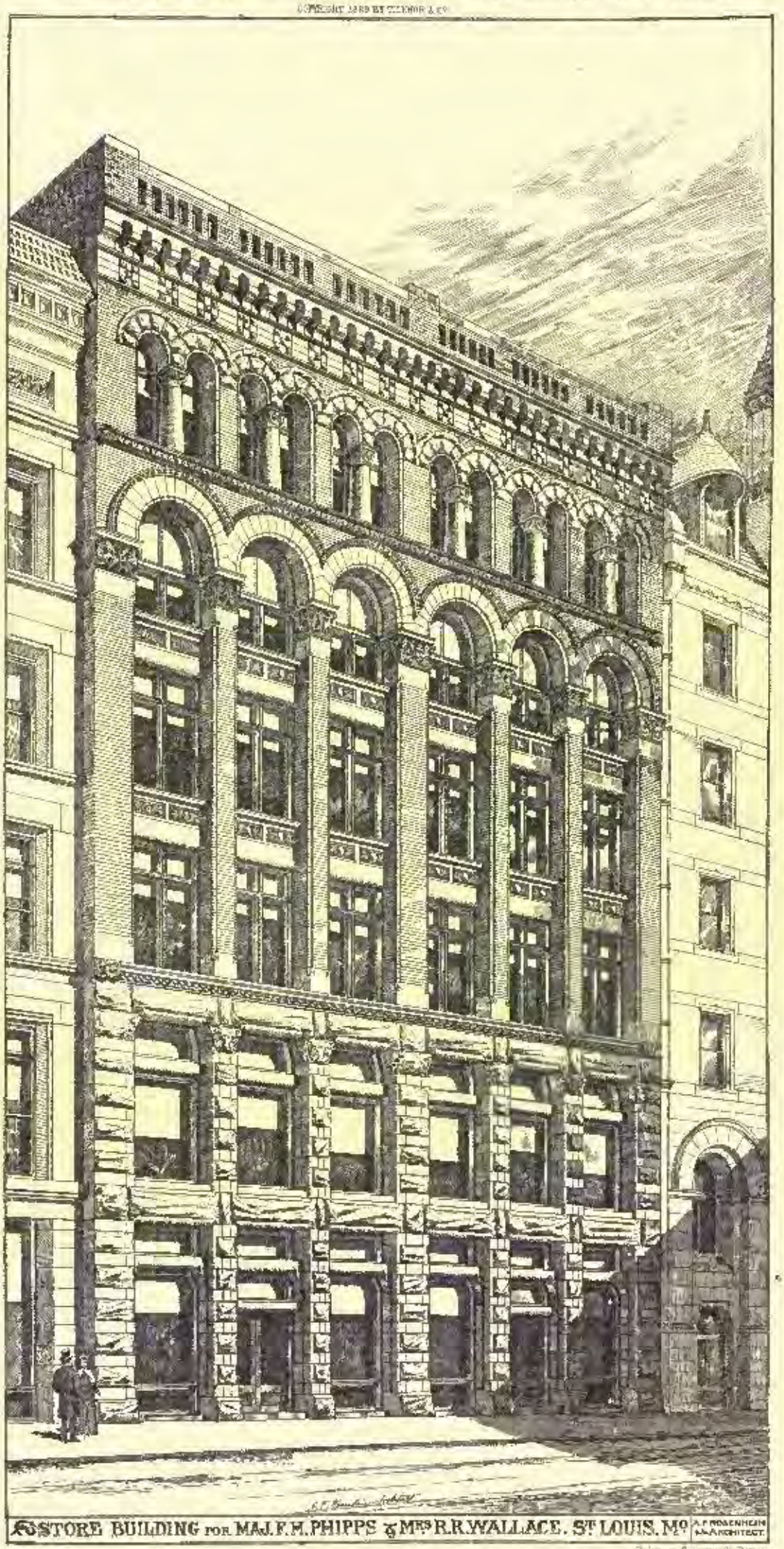

STORE BUILDING FOR MAJ. F. H. PHIPPS & MRS. R. R. WALLACE, ST. LOUIS, MO. A. F. ROSENHEIM, ARCHITECT.

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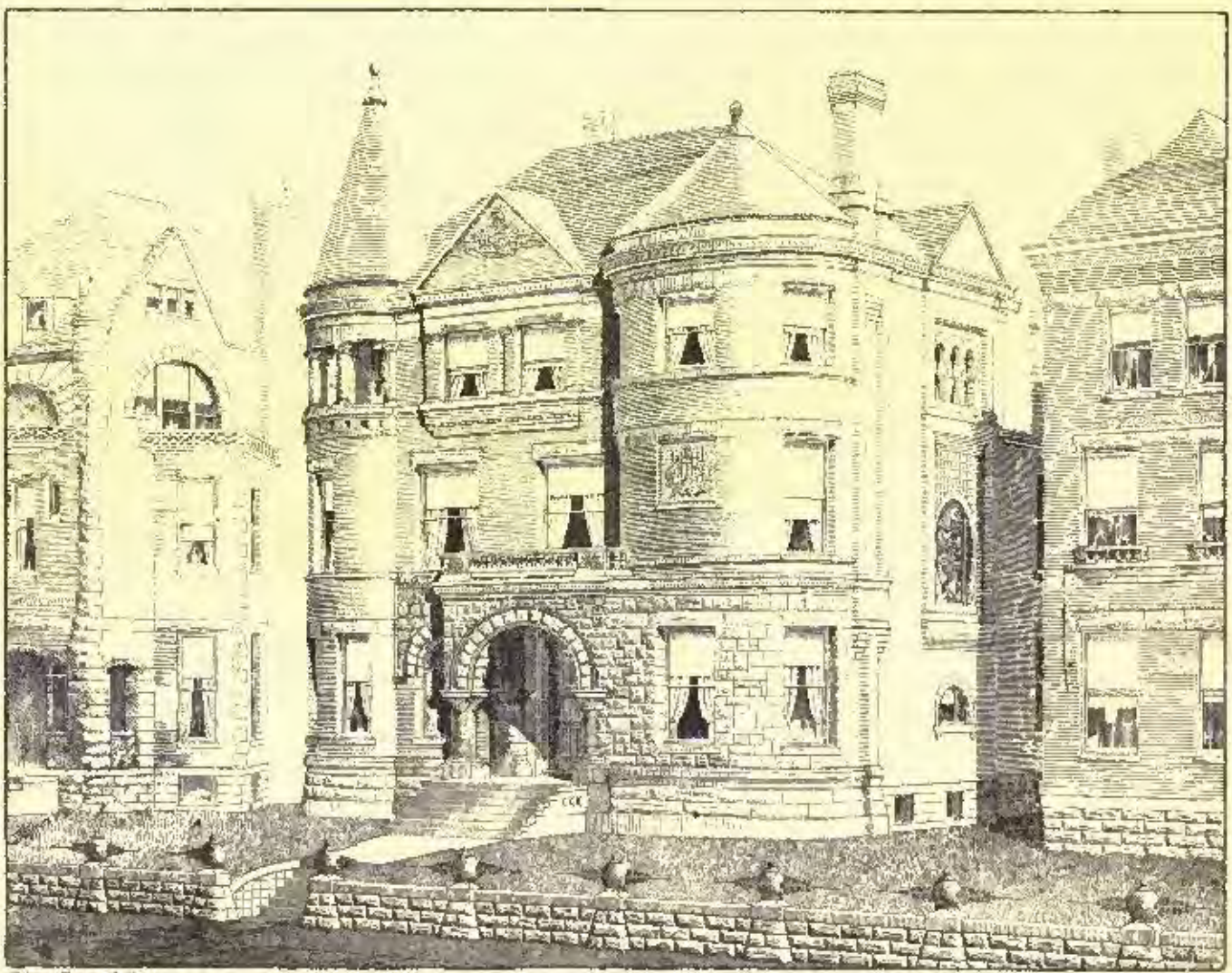

C.J.Clarke Architect Louisville Ky.

House of Mrs. Alice Bacon 4th Ave. Louisville Ky.

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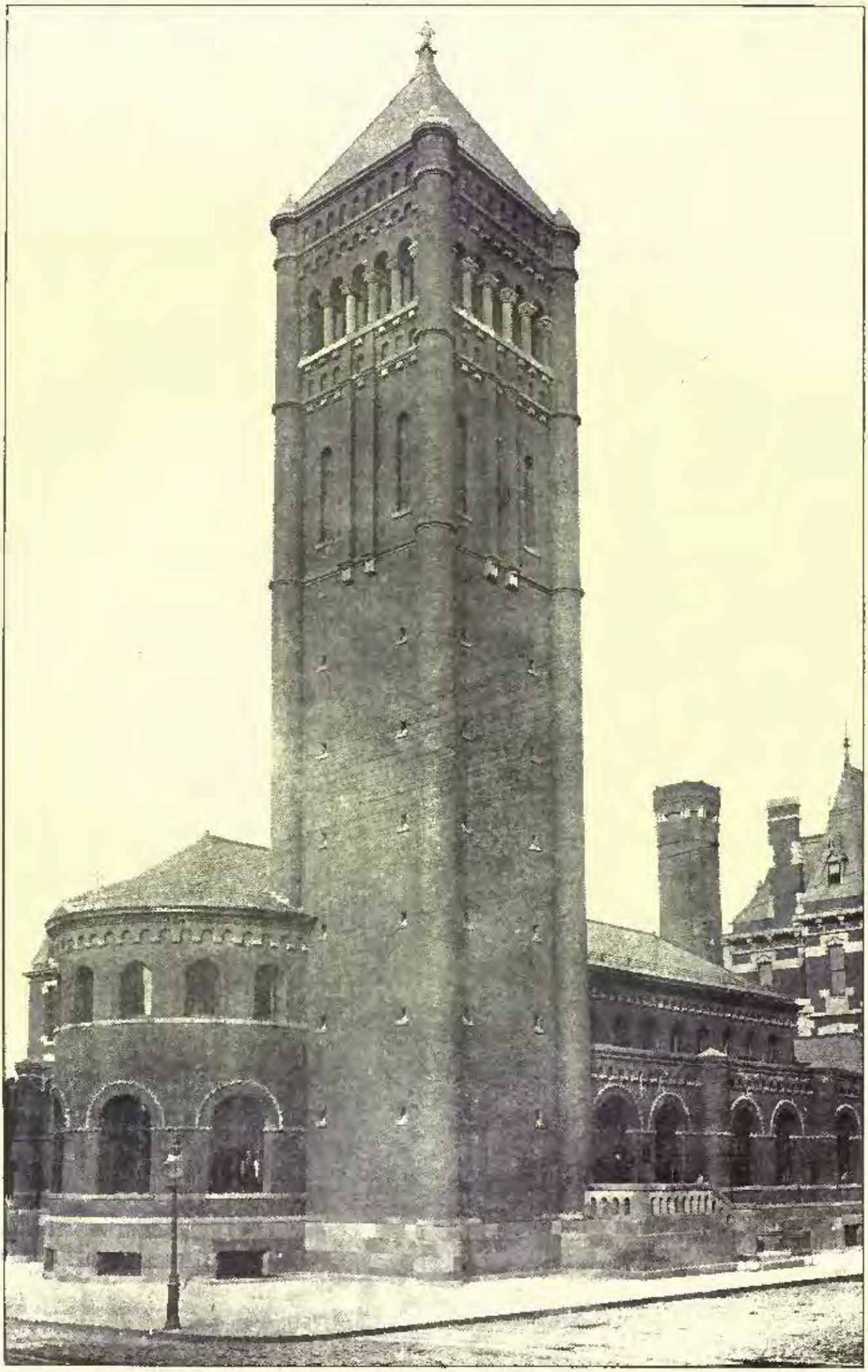

VENTILATING TOWER, PRESBYTERIAN HOSPITAL · NEW YORK · N.Y.
J.C. CADY & CO. ARCH'TS

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HELIOTYPE PRINTING CO BOSTON.

DOORWAY TO HOUSE OF JOHN PEABODY, ESQ., MARLBOROUGH STREET, BOSTON.

PEABODY & STEARNS, Architects.

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LAURENS.

LEGROS.

DALOU.

VICTOR HUGO.

ROCHEFORT.

BUSTS BY A. RODIN. SCULPTOR.

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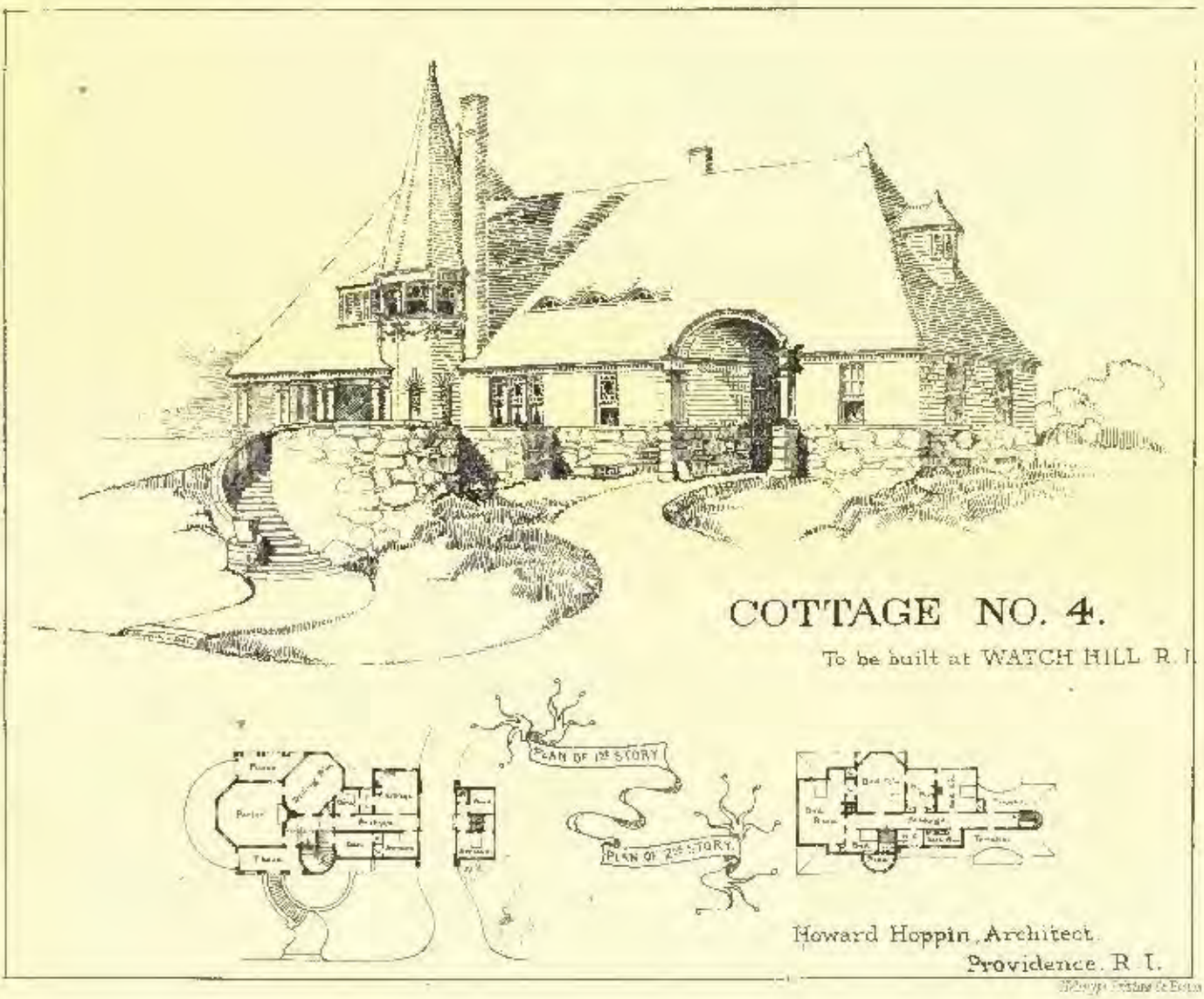

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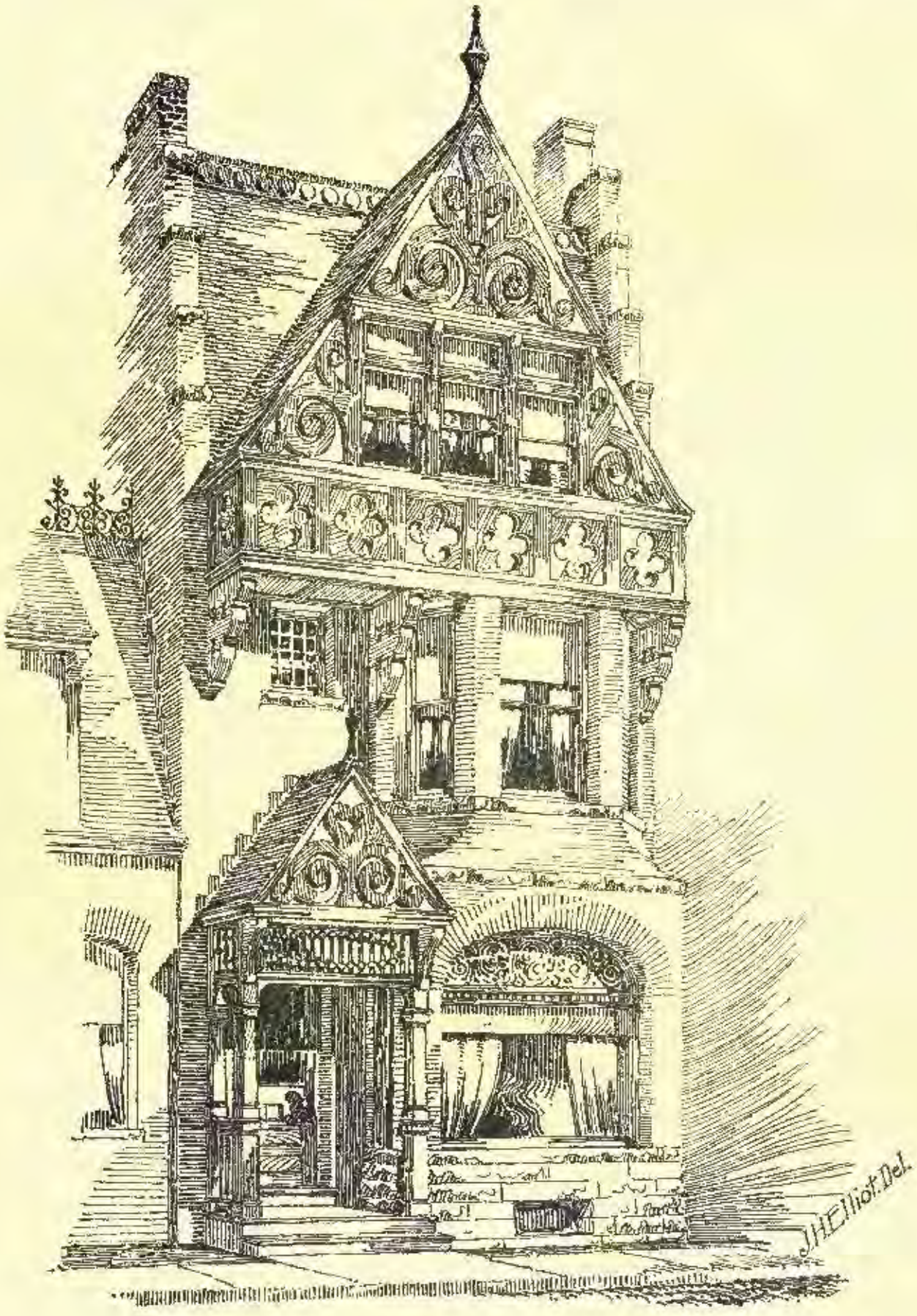


21 Rolyat Street Toronto.
Residence of Alex Tyre Esq.
Knox & Elliot Architects.

years for the distribution of compressed air for motive-power purposes. An air-compressing installation of 3,000 horse-power was laid down at Belleville, and the work was pushed on with such energy that there are now 55 kilometres (34) miles of compressed-air mains in action, in addition to 65 kilometres (40 miles) of pipes for the time service. The two trunk mains of the compressed air service are each 11.8 inches in diameter. The first, which is in operation, starts from the Rue Saint Fargeau, descends to the Place de la Republique, which it traverses, and then follows the grand boulevards as far as the Madeleine. The other descends parallel to the first as far as the Rue des Pyrénées, runs to the Place de la Bastille, and follows the Rue St. Antoine and the Rue de Rivoli as far as the Place de la Concorde, where it joins the first in the Rue Royale. This second main is not yet completed. The distribution to the houses is made by pipes varying from 1¼ inch to 4 inches in diameter, according to the demand to be met. On October 1, 1888, the demands for power from these mains amounted to 400 horse-power for manufacturing and trade purposes, and to 589 horse-power for generating electric-currents to feed 4,200 incandescent-lamps and 107 arc-lamps. There are six central electric-lighting stations equipped to utilize 100 horse-power each, and three of 50 horse-power each. In addition there were three private installations 50 horse-power each at theatres, eight installations varying from 10 to 25 horse-power at cafés and restaurants, one of 45 horse-power at the office of the *Figaro*, one of 12 horse-power at the Hôtel Meurice, and four of smaller sizes, making 350 horse-power in all. Air is also supplied to thirteen sewing-machine factories, to four ice manufacturers, to thirty-nine turners taking about 2 horse-power each, to sixteen printers aggregating 43 horse-power, to thirty-five saw and moulding mills, taking about 70 horse-power in all, and to eighty-six miscellaneous industries.

Paris presents a capital field for the exploitation of such a system as this. Its industries are nearly all small ones, and require only a moderate amount of power. But when the power is derived from a steam-engine the expense is relatively great. The police regulations do not permit of boilers being placed on upper stories where the work can be best carried on, while small engines and boilers are notoriously inefficient, and cost almost as much for attendance as motors of much larger size. Gas-engines offer great advantages to small manufacturers, but when the gas costs 7*s.* a thousand feet, as it does in Paris, they are not economical. These facts explain the great success of the Compagnie Parisienne de l'Air Comprimé, Procédés Victor Popp, which, in little more than two years, has sprung into a most flourishing position, and is advancing by leaps and bounds. In the interval between October 31 and December 20 of last year there was an increase in the air delivered for power purposes of 78 horse-power, and for electric-lighting purposes of 264 horse-power. Financially, the undertaking is in a capital position: we have before us an account of the receipts and expenditure, which, however, we are not at liberty to publish, but which shows that the shareholders will receive a most satisfactory return on their capital.

After several tentative attempts have been made at electric-lighting the Municipal Council of Paris has determined that the time has come at length for a comprehensive scheme, and in the last days of December a concession was granted to the Popp Company for an area extending from the Madeleine in the west to the Place de la Bastille in the east, and from the line of the Rue de Rivoli in the south to the grand boulevards in the north. This is in many respects the most important section of Paris from an electric-lighting point-of-view. It is more than two miles long and nearly a mile wide; it is crowded with cafés, restaurants, theatres, shops and hotels, all of which will, sooner or later, abandon the use of gas. The competition for the concession was keen, the following interests being represented: Rothschild (Marcel Desprez), Edison (Compagnie Edison), Cuenier (representing Denon), and Milde (representing a group). The Popp Company was chosen as presenting the best guaranty of giving satisfaction to the public for electric light and power; they propose to lay down plant immediately, it being estimated that 150,000 lamps will be required eventually.

It is well known that distribution by compressed air has a very low efficiency unless the air be heated before it is employed in the motors. According to a report by M. Joseph Francois, the air, if employed cold, has an efficiency of 46 per cent; if heated to 200° C. (392° Fahr.) previously to being employed in the motor, it has an efficiency of 64 per cent, while, if water be injected into the heated air, the efficiency rises to 87 per cent, as by the following table:

EFFICIENCY OF COMPRESSED-AIR DISTRIBUTION SYSTEM.

—	Cold Air.	Heated Air.	Heated Air with Injection of Water.
Weight of air delivered per indicated horse-power of motors	170 lb.	78 lb.	58.6 lb.
Volume of air per indicated horse-power	1363 cub. ft.	974 cub. ft.	727 cub. ft.
Temperature of compressed air at motor	68 deg. F.	392 deg. F.	392 deg. F.
Temperature of exhaust	—60 "	32 "	122 "
Efficiency of compressed air	46 per cent.	64 per cent.	87 per cent.

It is stated that these results have been found by experiment, though they appear to be very high; they are about 8 per cent better than those calculated for under similar conditions by the promoters of the Birmingham Compressed-Air Power Company. By the consumption of .44 lb. of coke and the injection of 6.6 lb. of water per horse-power per hour, the efficiency is raised to 87 per cent, it is said. For practical purposes, M. Francois takes the efficiency at 80 per cent, and on this basis he has made a calculation of the cost of working fifteen air-compressing machines of 400 horse-power indicated (6,000 horse-power in all). He estimates the buildings at £18,000, the land at £14,000, the compressing machinery and boilers at £84,000, the pipes at £54,000, the air engines and fixing at £20,000, and other expenses at £10,000, or £200,000 in all. M. Francois assumes that the installation will be at work sixteen hours a day on an average of the entire year, basing his assumption on the experience of the Compagnie Parisienne de l'Air Comprimé, and on the hypothesis that secondary batteries will be used in electric-lighting. He puts the coal consumption at 2.2 lb. per hour, equal to £100 a day; wages at £32; accessories and repairs at £8; and salaries at £4, or an aggregate of £144 per day for the compressing station. The supervision of the motors he estimates at £16, and the management of the company at £20, the total daily expense being:

	£
Interest and amortization	65
The compressing station	144
The motors	16
General expenses	20
	245

With the assumed efficiency of 80 per cent, the customers would receive 4,800 × 16, or 76,800 horse-power hours per day, which would cost to supply £245, or about 7¾*d.* per hour. If the cost of the coke is reckoned at one-tenth of a penny, the total expense may be estimated in round figures at one penny, which is an addition of 16 per cent for losses of various kinds.

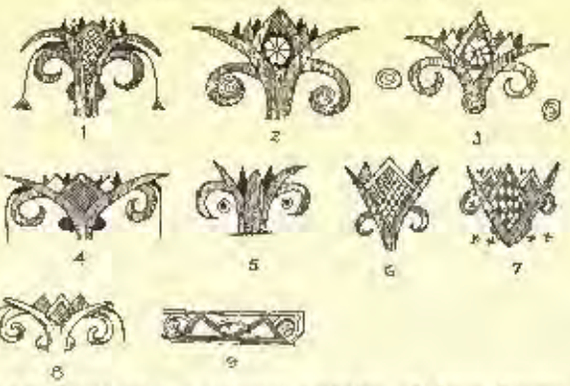
It is interesting to compare this estimate with that made in 1883 by Messrs. English, Hanssen, and Sturgeon for the Birmingham scheme. In the latter case the expense of the plant came to £200,000, as in Paris. The indicated power of the compressing engines was 8,400 horse-power. They were, however, only estimated to work at full power ten hours a day, against sixteen in Paris, so that the fixed expenses per hour were, consequently, greater. However, there was a great saving in the item of coal, which costs 6*s.* in Birmingham, against 20*s.* in Paris. Wages and salaries stand for £4,000, repairs and renewals for £5,000 a year. The total sum of the yearly expenditure is £21,000, against £65,000 in Paris, £28,000 of the difference being due to the coal bill. On the other side of the account, it is estimated that the customers will pay for 5,000 horse-power for about twelve hours per day during six days a week, or for about ten hours a day during seven days. The average price is put down at £9 a year per horse-power, or about 2*d.* per hour. Such a sum would pay all the expenses, and would leave £24,000 a year to pay 12 per cent interest on the capital.

The two estimates are sufficiently alike to confirm each other in many respects, but the Parisian scheme has a great advantage in the number of hours the machinery is expected to be at work. We may safely assume that a great part of the power will go for electric-lighting, for the manufactures and miscellaneous industries of the city will only absorb a small proportion of it, unless there should be a very great extension in the way of refrigerators and cold stores. We believe that this is an outlet which is expected to develop very largely, and it will offer the additional advantage that it will make the greatest demands in summer, when the least artificial light is required. The surplus power will be used during the daytime for charging accumulators, and in the evening part of the lighting must be done by batteries charged during the day, and part by current supplied direct from the dynamo in the evening. By this plan, both the compressing plant and the dynamo could be kept nearly continuously at work during the winter months.

The scheme is one of very great magnitude, and will be watched with much interest in all parts of the world. — *Engineering.*

THE LOTUS IN ANCIENT ART.[1] — II.

THE IONIC CAPITAL AND THE LOTUS.



I HAVE described the different varieties of lotus known to Egyptian decoration. That this flower was its dominant decorative motive, and that it was thus used as a symbol of immortality and of the resurrection, and as a solar, lunar and generative emblem,

[1] Continued from No. 635, page 69.

sacred to all three members of the Egyptian Trinity has been shown from the highest living authorities in Egyptology, as it is also clearly to be gathered from the monuments themselves. The Phœnician adaptations of Egyptian mythology and art symbolism in general, and of the Osiris, Horus and Isis cult in particular, with its attendant lotiform symbols have been alluded to as matters of current historical information. These with the dependence of Cypriote Phœnician art on Egyptian models has been made apparent.

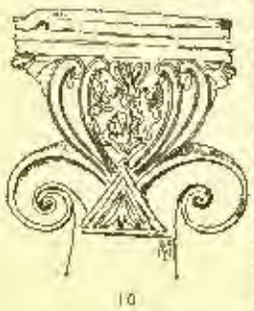
It has also been pointed out that the Cypriote Greek art of all periods so closely followed its early Phœnician models that a separation of the Cypriote Greek from Cypriote Phœnician motives in pottery or otherwise, is frequently or generally impossible.

It has been observed that this Cypriote Greek art represents the first progressive stage of the Greek art, or rather its introductory stage, down to a certain period—say in the seventh and eighth centuries B. C., and that it subsequently continued in this introductory stage owing to certain Oriental and conservative tendencies of the Greeks of Cyprus long after the Greek art farther west had abandoned its childhood and archaic period.

In the Cypriote lotus motives, whether on pottery or in stone, we are, therefore, always dealing with forms typical of an early period, however late the individual pieces may be.

It has been shown in the preceding article that the lotus flowers represented on Cypriote vases occasionally exhibit exterior scrolls or incipient volutes which are rude imitations of the downward curling calyx-leaves of the natural flower, as also illustrated from nature in that article. Such vase motives are also shown in the details 1–8 inclusive, in this paper. Among these details No. 8 shows a step further in the conventional direction apparent in No. 4, as appears in the diminished number of petals. In both these cases where the proportions most nearly approach that of the Ionic capital, the vases from which the motives are taken, are of such a shape and panelled in such a way that the expansion of the volutes and depression of the petals is clearly an adaptation of the floral motive to the oblong and narrow shape of the panel into which it is compressed. We have, then, in these two details 4 and 8, so far as vase decoration is concerned, a palpable approach to the shape which a similar lotus form might be expected to assume when used as an architectural decorative motive under pressure, when due allowance is made for the extra conventional quality belonging naturally to stone-carving.

No. 9 is a Cypriote proto-Ionic stone capital which approaches quite closely the general appearance of the detail 8. It is figured in Colonna-Ceccaldi's "*Monuments de Chypre.*" This work is a posthumous publication of the student whose suggestion as to the lotiform origin of the Cypriote stèle, figured at 10, was noted in the preceding paper. This stèle is reproduced in this article for convenience of reference and comparison. Unhappily, the capital in question (No. 9) was published from a design found among Colonna-Ceccaldi's papers after death, without comment or description. It is, therefore, placed at the close of the book which is otherwise mainly a collection and republication of articles from the *Revue Archæologique*, with a few similar inedited designs and memoranda. Measurements are figured on the capital in the original publication, and it is indexed with the word "Dali," the present name of the ancient Idalium of Cyprus. The said indication of locality or derivation is followed by a mark of interrogation.



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If Colonna-Ceccaldi had lived to edit this capital, he would probably have made a more successful interpretation in detail of the connection between the lotus and the proto-Ionic stèles and capitals of Cyprus than that recorded in my preceding paper, or, at least, he could have pointed out analogies with the Ionic form which are immediately obvious. So far as the lotus flower is concerned, we have seen that he considered the volutes of No. 10 to be conventional representations of curling petals. It has also been remarked that, as an actual matter-of-fact, the petals of the lotus never curl over or downward, and, as the calyx-leaves constantly do, it is more probable that the actual natural phenomenon was the starting-point of the conventional representation. Colonna-Ceccaldi had not observed the vase-designs in which these curling calyx-leaves are so

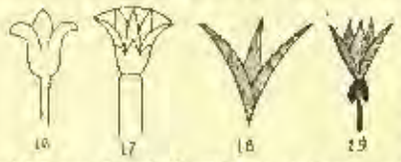
11 12 13 14 15

clearly represented, nor does he appear to have noticed this phase of the natural flower. As for the triangles of No. 9, these are obviously conventional reminiscences in stone-carving of a representation of two petal triangles analogous to that of the vase-design, No. 8. The intermediate curve is a conventional or decorative modification of the central triangle of No. 8 and related vase-designs.

No. 11 is a Cypriote stone stèle (tombstone) in the Metropolitan Museum of Art. The lower portion is clearly a lotus flower with conventional exterior volutes. The entire design may be compared with the vase-designs numbered 1 and 5. Cases of a more conventional proto-Ionic form, in which the volutes also rise from the lower part of the capital, are seen occasionally in the terminal supporting ornaments of furniture, as shown on Greek vases. Compare the Ionic of Mashnaka, Figure 38 of this paper.

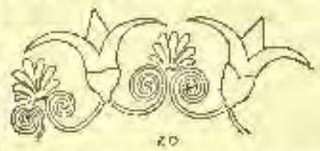
An analogous conventional Ionic design (Figure 12) is found in an Egyptian ceiling decoration of the eighteenth dynasty (eighteenth century B. C.) taken from the plates of Prisse d'Avennes, and may be compared with Mr. Clarke's capital from Naucratis, figured in my last paper.

We will now return to the Cypriote vase-design, No. 8, in order to compare it with a conventionalized lotus pattern taken from a Rhodian vase published in Salzmann's "*Nécropole de Camire.*" It is clear that 13 repeats the elements of 8, but in a more purely Greek and decorative spirit. A still further departure from the original form appears in the decorative motives of 14 and 15, which are taken from Greek vases of Melos (published by Professor Conze of the Berlin Museum). A similar vase motive has been previously specified by Dr. Samuel Birch of the British Museum as "a sort of trefoil lotus" ("*Pottery*," p. 184). We have reached, then, in these last designs a lotus motive consisting simply of a triangle between two spirals. Similar simplications of the lotus motive, where the spirals do not appear, may be quoted here as analogies which are already familiar to students, and which will presently assist the argument on the Ionic capital. For instance, the Egyptian motive 16 is a recognized simplification of a lotus motive like 17 (both taken from designs in Rosellini's "*Monumenti*").



16 17 18 19

In the same way 18 is clearly a simplication of 19, both lotus motives from Cypriote vases in New York, and the floral forms between the palmettes in 20 from an Etruscan cist are familiar lotus motives and already recognized as such in Greek decoration.



20

Before beginning the comparisons for proto-Ionic capitals let us finally notice the following conventional lotus patterns, 21 and 22 from Egypto-Phœnician metal-work found in Etruria (Regulini Galassi tomb) and 23, detail from the border of a Cypriote sarcophagus in the New York Museum and otherwise common in Phœnician decoration. In these last designs we return to a modified conventional form of the exterior spirals or scrolls combined with the central triangle.

We will now return to the Cypriote lotus patterns which furnish the starting-point of the argument in order to determine what this central triangle is. In these patterns (1 to 8 inclusive) it is clearly distinct from the petals. It undoubtedly represents the central calyx-leaf. In all Egyptian lotuses where the petals are represented the distinction of a larger triangle is given the centre calyx-leaf as in No. 17. Although in nature the calyx-leaves all curl downward together, if at all, the absence of perspective and foreshorting methods in ancient decoration and the habit of representing the central calyx-leaf as a larger triangle in lotus motives without the scrolls or spirals, as in 16, 18, 20, would explain this combination. Thus an explanation is reached of the conventional forms 14 and 15 as related to the natural flower. The central triangle is a reminiscent form of the central calyx-leaf represented erect. In the process of conventional elimination of minor details the petal triangles have disappeared entirely. Nos. 8 and 13 represent the intermediate conventional step.

21 22 23

If we now approach the proto-Ionic forms in architectural examples by way of the capital of the Sippara tablet reproduced from my first paper at 24, it becomes sufficiently clear that we are dealing here with a conventional form of lotus. The intermediate steps as far as forms in stone are concerned are all illustrated by 9 and 11.

There are cases of Greek-Ionic designs, of a comparatively late date, in which the central triangle still remains as reminiscence of the lotiform Ionic.

No. 25 is a capital from a Greco-Etruscan relief dating as late as the third century B. C., (from Conestabile's "*Perugia*)." No. 26 is the decoration of a bronze mirror handle found at Olympia ("*Olympia*" Plate XXII, Vol. IV) dating about 500 B. C.

24 25 26 27

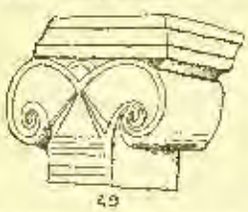
In No. 27, a capital from a Greek vase published by Mr. Clarke in his article already quoted, this triangle has been transformed into a curve just as the central calyx triangle is modified into a curve in No. 9.

The decisive significance of certain proto-Ionic stèles and capitals

from Cyprus for the history of the Ionic capital now becomes apparent — in view of the transitional character of the art of this Island — of its geographical location as a connecting point between the Oriental culture and the Greek, and in view of the fact that Cypriote art continued in the grooves of the Oriental Greek stage long after the further development of the Western Greek art. In the case of No. 10 there are positive grounds for not assigning an earlier date than 500 B. C., connected with the style of the sarcophagus with which it was found, but the central triangle between the volutes is undoubtedly a survival of the central calyx-leaf of the lotus. (Not a representation of the ovary as suggested by Colonna-Ceccaldi — it will appear subsequently that the lotus ovary is represented by a rosette.) The upper introrse scrolls of this stèle will be subsequently explained. A stèle (probably a tombstone) of related form in the Louvre (28) shows that we are dealing with a type and not with an exceptional case.[1]

Two Cypriote capitals, also in the Louvre, show the same significant triangle (Nos. 29 and 30). The curve which joins the volutes in 29 appears to be a decorative development from the crescent in 30. Here the association of the solar disk and crescent, familiar emblems of Phœnician worship of the sun and moon, or of gods which personified them, carries us back to the previously noted connection

28.



29

between the lotus and the worship of the sun. A similar association with the solar disk and crescent appears in the Louvre stèle, No. 28. Whether or no we are dealing with a conventional survival of emblems which had lost their significance, it is immaterial to inquire. That the association did originally have a significance is fairly proved by No. 11. The head, which appears about the lotus flower, is clearly seen in the original to be one of Hathor (Isis) the Moon-Goddess, where relation to the lotus has been explained.

That the Ionic capital had originally a hieratic and sacred significance is probable from the engraved Assyrian cylinder published by Layard, "*Culte de Mithra*," from which the detail 31 is taken, and from the support of the solar disk on the Sippara tablet.

For the Egyptian association of the lotus with the god Horus and the solar disk see the preceding article, and compare the Hittite relief at 35 of this paper, where Ionic capitals support the Egyptian solar-winged disk — a form of the god Horus (Pierret, as quoted).

The presumptions established by the foregoing comparisons may be summed up as follows: Assyrian proto-Ionic forms are like the Cypriote in retaining the rudimentary signs of a lotiform origin. As Egypto-Phœnician influences on Assyrian decorative art are known to have been powerful and manifold, there is no *à priori* difficulty in admitting that the proto-Ionic forms were among them. The Assyrian inscriptions, especially those of Largon, expressly state that Assyrian palaces were imitated from those of the Syrian Hittites,

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whose ornamental art, so far as known, has mainly a modified Egyptian style. As all the lotus motives of ancient art are admitted to have been originally Egyptian, the Ionic form is originally Egyptian if it be a lotus motive.

The question may now be asked: If the Ionic form is Egyptian, why do we not find it in Egypt? I answer that we do find it. The cut herewith (33) from Rosellini's "*Monumenti*," Vol. II, Pl. LXXXI, is the handle of a mirror, to be sure, but it is clearly an imitation of an architectural column and capital, and the Ionic volutes are portions here of a conventional lotus. Cut No. 34 is decisive (reproduced from the foregoing article). It is one of the series published by Prisse d'Avennes from Egyptian wall-paintings, in which originals in metal or in wood, or in the two materials combined, are to be presumed. Belonging to the eighteenth and nineteenth dynasties, these forms antedated any of those known to Assyrian art by a number of centuries. They are not less than seven centuries earlier than the earliest Assyrian Ionic forms, and as we know that Assyria was an Egyptian province under the eighteenth dynasty, we are not even under the necessity of assuming a Phœnician intervention as regards the transmission. The lowest member of this capital is a conventional lotus bud. The next is a lotus flower of the form most commonly known to Egyptian art, associated with two lotus buds. Above this we observe that form of the lotus-Ionic capital in which the calyx triangle appears between the calyx volutes, a common Egyptian architectural form, as seen at Figure 37 of this paper.

The top member of the capital shows an absolutely Ionic form so far as the upper line joining the volutes is concerned. The ornamental detail figured at 12 is another instance of Ionic forms in Egyptian art to which other illustrations can be added. The Hittite relief at Boghaz Keui, in Asia Minor, where proto-Ionic capitals support the winged solar disk, may be also adduced as an illustration (35). The monument may be Hittite, and the art may be Phœnician, but the winged disk carries us back to Egyptian influence and the association of the lotus with Horus, one of whose forms is the winged disk, is a parallel with the appearance of the solar disk and crescent in Nos. 28 and 30, and with the appearance of the head of Isis Hathor at 12. The date of this Hittite relief is probably not later than the second millennium B. C.

34

The Egyptian Ionic forms illustrated at 36 and 37 are not especially remote when we consider the number of Ionic capitals now known in which the spirals rise from the necking. The instance illustrated at 38 is probably Syro-Phœnician, antedating the Greek influence in Syria (from a relief at Mashuaka, published in Reber's "*History of Ancient Art*," p. 42).

The absence of Egyptian lotus-Ionic forms in the existing stone monuments, in contrast with the multitude of capitals like 36 and 37, represented in paintings and reliefs, is undoubtedly explained by the fact that, in Egyptian use, these forms were confined to architecture in wood, with or without metal decoration. It has been abundantly pointed out that the Ionic capital was originally designed for construction in wood (see, for instance, Mr. Clarke's article). The Greeks simply imitated or modified in stone capitals of wooden architecture, which have, consequently, disappeared. The absence of Egyptian stone architectural forms like 33 is thus explained. The lotus-Ionic volutes were not sufficiently solid in aspect for the severe and massive taste of Egyptian stone construction and decoration.

It has been observed in the preceding paper that the Persian explorer, M. Dieulafoy, has specified No. 37 as an Ionic form and as a lotus derivative, and that he has made it his starting-point for a theory of the Egyptian Ionic in which the volutes are conceived to represent petals bending downward under pressure, and the intermediate member is supposed to represent the ovary. My reasons for dissenting from this last interpretation will appear later. The reasons for supposing the calyx-leaves, rather than the petals, to have been the initial motive of the Ionic volutes are already apparent. It is certainly to be admitted as a possibility that a form like 37 is a decorative exaggeration of the form 16, which is a simplification of 17. It is clear that the volute of 36 could be easily reached from the curves of 37. If any one should prefer this theory of the lotiform Ionic, I will only ask that judgment be held in abeyance until the observations on the anthemion and on its peculiar relations to the Ionic capital have been offered.

It is true that Cypriote vase-designs of the second millennium B. C. are not a conclusive link in a chain of proof relating to Egyptian forms which are possibly much earlier as regards the type. We can only insist on the persistence and long-established typical character of all forms in Oriental art; on the continuance in Oriental art of initial conventional forms long after highly remote decorative developments of the same have been reached; on the intimate relations

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38

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37

between Egypt and Cyprus; on the rarity of decorated pottery in Egyptian tombs; and on the fact that the study of Egyptian pottery is admittedly the most backward branch of Egyptology. The point that my own observations are the first published on the lotus-volutes of Cypriote pottery is an indication that something of the same kind may be almost any day discovered or brought to notice in Egyptian design.

In general, and aside from M. Dieulafoy's observations, the significance of the Egyptian Ionic forms has been disregarded even by authors who have published them. As explained in my last paper, all standard authorities have considered the Assyrian Ionic as

[1] The more strictly archæological aspects of the subject as regards authorities, references and quotations, etc., are more fully published in the *American Journal of Archæology* (Vol. III, Nos. 3 and 4).

original of the Greek. The only formal announcement of the significance of the Egyptian Ionic (aside from M. Dieulafoy) has been made by Auer in his paper on the Egyptian origin of the Doric Triglyphs (p. 356, *Zeitschrift für Bildende Kunst*, 1880), and without reference to the lotus.

Some explanation of the reasons why the Assyrian proto-Ionic designs have so far thrown these palpable and much earlier Egyptian Ionic forms into shadow, may appropriately be offered as conclusion of this article. The only satisfactory treatment of proto-Ionic forms is that which considers the relations and analogies between all of them, and which unifies all of them under one point-of-view. The only basis for such an examination is that which takes the lotus as a starting-point. As soon as the lotiform development of the Ionic becomes clear, the Egyptian phases of it take their proper place. Otherwise the Egyptian voluted capitals may readily be considered as having only an accidental resemblance, and as being too remote in time and place for any relations with the Greek Ionic.

Another consideration is this. The study of the foreign origin of Greek art has only been developed since the time of Assyrian discoveries, *i. e.*, since 1800. Assyriology has attracted that extra amount of attention which is always claimed by a new study as against an older one, and all the analogies with Greek art discoverable in it have received the same preponderant amount of attention. For the same reason the palpable dependence of Assyrian art on Egyptian and Egypto-Phœnician ornamental forms has not received due attention. It has not been sufficiently observed that the campaigns and conquests of Assyria in Egypt during the eighth and seventh centuries B. C., resemble those made by Spain and France in Italy during the early sixteenth century. In both cases the military strength is that of the more brutal, more recently civilized nations, and the civilizing influences are those of the older and, physically, weaker state.

We cannot, of course, ignore in Assyrian art and history the superior importance of the earlier Chaldæan culture, but no traces of any of the decorative motives under consideration have been found so far in this earlier Chaldæan art.

Of all authorities so far, Reber[1] has come nearest the truth regarding the Ionic capital in suggesting that the volutes of the Assyrian proto-Ionic originally represented the curling leaves of a plant. "There is reason to suppose that the double helix was not the primitive and normal form of the Assyrian capital, but was rather an abbreviation of the leaved calyx so frequently met with in Phœnicia, Palestine and Cyprus, and that the rolled ends of the leaves originally suggested the volutes of the capital and the various spiral forms occurring upon carved Assyrian furniture" (Plate 70 of the work cited). To Reber's view we have only to add the point that the plant in question is the lotus with the consequent conclusion that the form is derived from Egypt. This point he does not reach as appears from his matter relating to Solomon's temple (Page 150), where he says: "It is to be observed that the normal Egyptian bell-calyx, without additions, could not be spoken of as having the form of a lily, by which name the curled ends of leaves were usually designated in the Orient. The volutes referred to must have been similar to those upon the Assyrian capital, etc." At Page 231 he also alludes to the Assyrian origins of the Ionic capital.

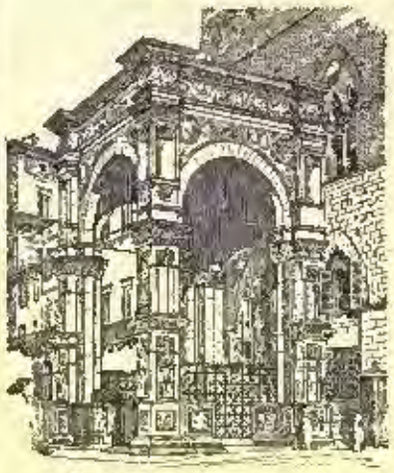
To a satisfactory argument on the origin of the Greek Ionic capital it is still necessary to add one point — an explanation of the palmette form which appears in the Ionic capital found by Mr. Clarke at Chigri, illustrated in the preceding article, (*American Architect*, February 9, 1889) and which also appears in the Athenian capitals recently published by Mr. Trowbridge (*American Journal of Archæology*, Vol. IV, No. 1). Before this explanation can be offered the subject of the Greek anthemion must be taken up — these capitals being simply phases of it. The demonstration of the lotiform origin of the anthemion will comprehend the Chigri and Athenian capitals and will react on the demonstration for the Ionic capital in an absolutely conclusive way. The anthemion is perhaps, best approached by way of the "rosette" and this subject again may be made clearer by some preliminary remarks on the so-called papyrus motives of Egyptian decoration. Wm. H. Goodyear.

[To be continued.]

[1] "*History of Ancient Art*"; translated by Joseph Thacher Clarke. Harper & Bros., 1882.

Cliff Dwellings in Morocco.— Cliff dwellings are found in great numbers in Morocco which are now and probably have been inhabited from the time of their first construction. These dwellings in all particulars are like those found in Arizona and New Mexico on this continent. A New York paper speaks of them as follows: It was not until last year that the Moors would permit any examination of the cliff dwellings which have long been known to exist some days' journey southwest of the city of Morocco. The strange city of the cave-dwellers is almost exactly like some of those in New Mexico and other Territories, which archæologists have explored. The dwellings were dug out of the solid rock, and many of them are over two hundred feet above the bottom of the valley. The face of the cliff is, in places, perpendicular; and it is believed that the troglodytes could have reached their dwellings only with the aid of rope-ladders. Some of the dwellings contain three rooms the largest of which are about seventeen by nine feet, and the walls of the larger rooms are generally pierced by windows. Nothing is known as to who these cave-dwellers were.— *Exchange.*

HOT BATHS OF ANCIENT ROME.[2]



The Pope's Loggia, Siena, Italy.

There is no ancient treatise extant on the hot baths of Rome, nor on their methods of bathing. Celsus and Galen, being physicians, naturally only treat of the bath as forming part of the treatment in cases of disease. We gather, however, that the methods were much like those adopted in our Turkish baths; some went gradually from the warm room, through the hot, into the laconicum; and some began with the laconicum and went gradually through the cooler rooms, and in both cases then took the cold bath. And much of the bathing was done by having buckets of water of different temperatures poured over the bathers. Some were oiled before they began to bathe, some during the process as well, and all were so after it; some, of course, with perfumed oil or unguents. Julius Cæsar left 8,000,000 pounds of oil annually to the bathers of Rome. Before the final unction they had been strigilled and shaved.

In Lucian, who lived in the time of the Antonines, there is a description of a public bath built by Hippias, an architect, and a friend of Lucian. In it there is no mention of the laconicum, but it gives us some notion of the way of bathing, though this bath was probably very insignificant as compared with the vast Roman Thermæ. "After you have passed a lofty vestibule, to which you ascend by a flight of steps of an easy ascent, you enter a spacious hall, proper for attendants to wait in. To the left are rooms set apart for the company before they leave the baths, the most elegant and cheerful of any. As you advance you enter a room, not wanted in the baths, but appropriated to the more opulent; after which, on both sides, are places for your clothes. The middle of this room is exceedingly lofty, very light, and contains three lavacra of cold water, ornamented with Lacedæmonian marble; in the same room are marble images of ancient work, one of Health and another of Æsculapius. As you go out of the room, through an oblong, vaulted passage, the house grows sensibly warmer, although the heat is far from being disagreeable; this passage leads to a very light chamber on the right hand, where you may be supplied with unguents; this room, likewise, has a communication with the Palæstra, and both sides of the door are cased with Phrygian marble.

"The next apartment is the most beautiful of any yet mentioned, being resplendent with Phrygian marble to the very ceiling; in it are many conveniences for sitting; it is also sufficiently extensive for walking or taking exercise. On going out you enter a hot passage, long enough for a race, and encrusted with Numidian marble, which leads you to a very elegant and light room, painted of a purple color; in it are three warm baths. After having bathed you need not return by the same way you came, but slowly by a shorter way, which brings you to the cold bath through a warm room, gradually decreasing in heat. All these rooms are exceedingly well lighted from the top.

"Hippias has wisely constructed the room which contains the cold bath so as to front the north; the other apartments, which require a greater degree of heat, he has exposed to the south, southeast, and west."

The Romans had no thermometer, so we cannot tell what the precise heat was, but the water seems to have been hot.

Athenæus gives the following lines (*lib.* 1, *cap.* 32):

> "Plague take the bath I just see the plight
> In which the thing has left me;
> It seems I have boil'd me up, and quite
> Of strength and nerve bereft me.
> Don't touch me, curst was he who taught a
> Man to soak in boiling water."

That stoic philosopher, Seneca, whose business Macaulay describes as being "to declaim in praise of poverty, with two millions out at usury; to meditate epigrammatic conceits about the evils of luxury in gardens which moved the envy of sovereigns; to rant about liberty while fawning on the insolent and pampered freedmen of a tyrant; to celebrate the divine beauty of virtue with the same pen which had just before written a defence of the murder of a mother by her son,[3] was very severe on the heat of the water in the baths, and says: "It is hot enough to boil a naughty slave in."

Both Martial and Celsus describe the heat of the laconicum as dry heat. If the heat was anything like that of our Turkish baths, from 230° to 300° Fahrenheit, and there were water in it, the bathers would, I should think, have been scalded to death with the steam.

[2] Extract from a lecture before the students of the Royal Academy by Professor Aitchison.

[3] "*Lord Bacon*," Macaulay's Essays.

I read an account of a fire-king at a country-fair who remained in a hot-room till a fowl was cooked, and then ate it. A chemist who happened to be there, and had ascertained that there was no trick, thought it over, and concluded that the heat was possible to be borne from the air being dry; next day he inserted unseen a bowl of water, and shortly afterwards the fire-king burst open the door, half scalded to death.

The recesses round the laconicum, *i. e.*, in the thickness of the wall, are paved and lined with white marble slabs, and have seats. One that remains looks like a water-bath, though I saw no exit, but some believe that they contained no water, but were used by old bathers, who could not get heat enough in the room; for they must have been hotter, as, in addition to the hanging-floor, the walls were lined with flue-pipes. In Pliny the Younger's letter to Romanus he tells us that Macedo, a person of Prætorian rank, whose father was a slave, was trampled to death by his servants, who "threw him upon the burning pavement of the hot bath to try if there was any remaining life in him."

Many think that the Roman method of bathing is still adhered to in the East. I can give you my experience of bathing in one of those in Cairo, and I trust that the ancient Roman ones were not so offensive to the sense of smell.

I was first ushered into a vast hall, lit by a lantern, with a raised seat for the bath-keeper and a baldachino over the coffee-stove, with a fountain in the middle of the hall. The whole hall was gorgeously painted, and had towels drying on the tie-beams, which the attendants hung up and took down by means of long bamboo poles. A little above the main floor were a series of carpeted compartments, each as big as a small room. Here I undressed and wrapped myself in cloths, while my interpreter folded up my clothes and tied them up in a sheet. I was then led by an attendant across the hall to a dark passage, and was ushered into a darkish hot room, where I sat on a marble seat, and I was gradually moved from room to room, each of which was hotter than the last, until I was taken into a light-domed room, with a central peristyle, in the middle of which was a large steaming tank of water, with steps running down into the water. The walls were lined with white marble, inlaid with colored ones in patterns; the domed portions of the peristyle were plastered and lit by star-shaped openings, several in each dome, the space between each arch and the wall being domed.

Within the marble margin of the bath was a gutter. I was laid down at the side of it, rubbed with a horsehair glove, and then soaped over and scraped with a sort of artificial sponge, composed of dried grass resembling diminutive bamboo. I was then washed by hot water being poured over me from a large copper cup, and when this was finished I was made to walk down the first step and sit down with my legs in the water, which was nearly scalding. I was then made to sit lower and lower, till I was up to my middle; the attendant then went into the bath, caught hold of my hands, and jumped me into the hot water, and put my head under it several times. I was taken back by the passage into another darkish room, where two marble basins, projecting from the wall, were running over with hot and cold water; water was dashed over me from a cup, at first hot, afterwards tepid, and at last quite cold, and I was then led back to the place where I undressed. I was then dry-shampooed, and every joint in my body cracked, including my back-bone, both backward and sideways.

The Egyptians had their heads shaved, their beards combed, their nails cut, and their feet rasped. After my dry-shampooing I was covered up, laid on a cushion, given a cup of black coffee and a narghiley. I felt quite refreshed and ready for dinner, though I had started at 2 A. M. that day, and been up the big Pyramid and into the King and Queen's chamber, and had a long ride back.

As I think we know enough about the exercises, and all I can tell you about the method of bathing, I will go back to the plan.

SOCIETIES

YOUNG MEN'S CHRISTIAN ASSOCIATION, NEW YORK.

THE Library Committee of the Young Men's Christian Association of New York invited, on Washington's Birthday, the architects and students of the architectural schools of the city, to an exhibition of books contained in their library, on architecture and the decorative arts. The exhibit was from 11 to 5, and during those hours several hundred visited the library. Much surprise was expressed at the extent and richness of the collection. Only a partial display of the books could be made, as the capacity of the tables was not sufficient for all. The library contains about 600 volumes, in the two sections exhibited; 450 in the line of architecture, of which upwards of 350 are folio and quarto volumes, and 118 volumes of folios in the decorative arts.

The collection embraces works on architecture by Pugin, Alberti, Gailhabaud, Fergusson, Viollet-le-Duc, Ruskin, Vitruvius, Street, Britton, Daly, Rickman; and on decoration by Prignot, Berian, Audsley, Claessen, Dresser, Day, Jacobstahl (*"Die Grammatik der Ornamente"*) Liénard, Daly, Gerlach, Pugin, Shaw, Adrouet. There is a complete set of the *American Architect* in the library and of the *Revue des Arts Décoratifs*.

BOSTON ARCHITECTURAL CLUB.

THE Boston Architectural Club held its fortnightly conversazione Thursday evening, February 28, at the club-rooms, 6 Hamilton Place.

The subject of the evening was "Architectural Travelling in Europe."

Mr. Peabody read notes of his travels in England.

Mr. Newton traced the best routes through Spain, indicating where to depart from the usual paths to advantage.

Mr. Andrews described the various changes and influences in the architecture of France, and pointed out where they are the most clearly distinguished, leaving to the student the choice of the locality appealing to his individual taste.

Mr. Bacon described the more convenient ways of reaching Athens and Olympia, and Mr. Walker dwelt at some length on Italy and what to see there.

The discussion was closed by Mr. Blackall who gave some details of necessary expenses, etc.

The water-color exhibition by members of the Club closed February 27, and was well attended.

The principal exhibitors were: E. C. Cabot, F. H. Bacon, C. H. Walker, Ross Turner, R. A. Cram, R. C. Sturgis, and included sketches abroad and many drawings of local interest.

RESOLUTIONS OF RESPECT TO THE LATE H. M. BLAKE.

Whereas, in the inscrutable ways of an all-wise Providence, our Superintendent has been removed from us by sudden death, we, associated with him, desiring to express our deep sympathy with his wife and family in their affliction, do unite in this expression of our warm regard for him, and deplore deeply his death.

Words are inadequate to express our sorrow, and language cannot console in this sad bereavement, but we cannot refrain from some expression, and so convey this, our sympathy, as best we can. May He "Who doeth all things well" have ever in His keeping the wife and children left behind, and raise up many and warm friends who will care for the widow and fatherless.

Be it resolved, that a copy of the above resolutions, adopted at a meeting of the employés of the late Howard M. Blake, be forwarded to his family and near relatives, and that they be inserted in the Boston *Herald* and *American Architect*. D. W. GRAY.

For the employés of the deceased.

IN MEMORIAM.

JAMES HOWARD SPRUANCE, a young architect of Philadelphia, who recently won a prize for design in a competition at the Philadelphia Chapter, A. I. A., died at Denver, Colorado, on February 22, in his twenty-third year. He was buried from the residence of his parents, James W. and Fannie C. Spruance, near Smyrna, Delaware, on Thursday, February 28, at 1 P. M.

COMMUNICATIONS

FEES ON PARTY-WALLS.

KANSAS CITY, MO., February 21, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—If an architect contracts with a client to furnish general drawings, specifications and details for a store building at the usual rate per cent on the cost of the completed building, on one or both sides of which is a party-wall in place, one-half of which it is expected will be used and paid for by the client, is it usual and customary to include the value of such half of party-walls in the cost of the completed building in computing the architect's fees when it is not specifically mentioned in the contract? Can you cite any legal decision in which the architect is allowed for the value of party-walls in arriving at the amount of his fees? If you will do me the favor to answer, it may be of interest to others in the profession.

Yours truly, A. V. B.

[It is usual, so far as we know, to pay architects commission on the portion of the party-wall acquired by their clients. We do not think there is any recorded decision on the subject. —EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE CHURCH ORGAN AT LIBAU, RUSSIA.—A correspondent of *La Science en Famille* says that in the Protestant church at Libau, Russia, there is an organ which occupies the whole width of the church, about 60 feet, and which has 131 registers, 8,000 pipes, and 14 bellows of large size. It has 4 harpsichords and 1 pedal. The largest pipe is formed of planks 3 inches thick and 31 feet in length, and has a section of 7 square inches and weighs 1,540 pounds. Besides the 131 registers, there are 21 accessory stops that permit of combining various parts of the instrument without having direct recourse to the registers. By special pneumatic combination the organist can couple the four harpsichords and obtain surprising results. — *Exchange.*

Vandalism in Florence.—"Ouida," in a second letter to the London *Times* in regard to recent atrocities perpetrated in Florence under the pretence of improvements, says:

Every one knows the great hall of the Cinque Cento in the Communal Palace, where of old 1,600 delegates could meet in the name of the ancient liberties of Florence. In this grand hall of Cronaca and of Vasari there is to be seen, at this present moment a common painted wooden partition, cutting the mighty chamber in two; behind this wooden paling are displayed the designs and programmes of the rival engineers and architects who aspire to attain the eternal infamy of destroying and reconstructing the centre of Florence. The cheap and common wooden hoarding, the poor and paltry drawings and prospectuses, side by side with the superb frescos under the glorious ceiling and the superb archway, beside the statues of Leo X and Giovanni of the Bande Neri, with the white majestic form of Savonarola fronting them, are an apt and curious symbol of the mean and tawdry tastes of modern life, contrasted with the stern and splendid achievements of the past. No juxtaposition of dignity and imprudence was ever more distinctly displayed than in this infortuitous exhibition of the municipal projects of to-day in the great hall of Il Cronaca. The slightest sense of proportion — nay, even, the smallest spice of that humor for which their forefathers were famous — would have saved them from this bathos. The projects for the demolition of Florence should have been exhibited anywhere sooner than at the Palazzo Vecchio, where the very shields on the walls, the very lilies and crosses of stone, seem to cry out against them.

"Once we were lions, and then we fought. Now we are sheep, and we only follow," said an Italian to me but yesterday. It is sadly true. The rage for imitation — imitation of all the most trivial and destructive temper of modernity — possesses Italy in the persons of its municipal counsellors. That these counsellors do not in any sense represent the better part of public feeling is certain; you will probably find that your London Council will not do so either. Election by vote has a charming promise in its sound; but its practical result is usually that the best men stand aloof from submitting to its coarse struggles and its questionable awards. Allow me, in conclusion, to demur to your opinion, that none except Italians born on the soil have a right to treat of Italian matters. Gregorovius has deemed it his duty (as it was) to print his just, if unavailing, protest against the present ruin of Rome. It cannot be doubted that were Byron, Shelley, Keats, Stendhal, George Sand, Jules Janin, Châteaubriand, or Savage Landor all living now, they would write as I write. Swinburne, in his lines to Landor, calls on the city to remember him:

> "And thou, his Florence, to thy trust
> Receive and keep,
> Keep safe his dedicated dust,
> His sacred sheep;
> So shall thy lovers, come from far,
> Mix with thy name,
> As morning star with evening star,
> His stainless fame."

Florence was his (Landor's), because he loved her unspeakably. Think you that Dante would not more willingly have seen a Florentine worthy of the soil in Savage Landor than he would see one in any of the shameless contractors and architects hungering for her ruin, or in the rapacious lawyers and speculators who would break up the Venus de Medici into rubble, and melt down the Perseus into copper money, willingly, if they could!

Tunnelling the North and East Rivers, New York.—Two years ago Heman Clarke, the well-known contractor, broached a scheme for a great system of tunnels under New York City and the East and North rivers, connecting the city with the suburban points. Little attention was paid to the plan, as it was considered too expensive to be practicable. To-day Mr. Clarke announces the completion of the arrangements for carrying out the great work. A capital of $150,000,000 has been guaranteed of which $30,000,000 is considered sufficient to do the tunnelling. The tunnels will be 150 feet below the surface, thus avoiding all buried wires, gas-pipes, etc., and avoiding any difficulty with the rivers. The main tunnel will extend from the City Hall in New York to Fleetwood Park on the north, under Brooklyn to Coney Island on the east, and under Jersey City to Newark. There will be four tracks. Freight and passengers will be carried. The passenger trains will run at full express speed. Elevators will convey freight and passengers between the street stations and the tunnel. The plan for carrying freight will relieve the city streets of much trucking. Cars will be brought under the larger stores, and freight can be lowered directly to them. Negotiations are now pending with the city government for the required permission to begin work.—*Exchange.*

Curious Water-wheel.—There is a water-wheel in use at Bowdoinham, Me., which is probably the only one of its kind in existence. It is twenty-seven feet in diameter, with a foot of its rim out of water at high tide; the spokes are wide and set diagonally, like the vanes of a windmill. It turns eighteen hours a day by tide-water, running one way with the flow, the other with the ebb. With one foot fall of the tide this wheel gives about fifty horse-power.—*Commercial Advertiser.*

TRADE SURVEYS

So far the weekly and monthly statistical statements of railroad companies and large commercial and manufacturing organizations reveal what business men and financiers regard as a most healthful trade condition. If there are any latent evils they have not given indications of their existence. There is no issue before the country in which business men are deeply interested. The pressure for a national bankrupt law is increasing; the construction of a formidable navy is in progress. Financial conditions reveal no weakness, although there are reasons for apprehending stringency in time. The producing interests are not making complaints as to excessive taxation or immoderate rates of interest. The National Government stands close to the people, and the various State Governments are the willing servants of the people in all things, except where organized corporate interests are concerned. Even here there is a looser grip upon legislation, and a score or more of laws, of more or less drastic character, are up for passage; the ostensible purpose of which is to curb corporate capacity or power. Matters are moving along in the right direction. The percentage of mishaps in business is not increasing, rather declining, considering the increasing volume of business. This is surprising, too, when we count up the increase in manufacturing and general productive capacity that has been added during the past three years. No such additions as have been made during those years was then dreamed of. The most important, and usually least noticed, has been the increase in shop and factory capacity. Over one hundred thousand traders have been added to the list, and only about thirty thousand have dropped out, leaving an increase of seventy thousand to transact the business of the country. The volume of business has increased fully 30 per cent, but this does not represent the actual increase or potential increase in capacity. Hundreds of millions of dollars have been invested during that time which has not yet become productive, except in small part. The competition which it involves has not yet been felt. In short, the adjustments which this enormous increase of capital necessitates has not yet been effected, and when it does take place, it will exert a very marked influence on trade, and production in general. Not a single injury has followed from this rapid outflow of money. Financiers themselves confess to feelings of surprise and of gratification at the outcome of these extraordinary expenditures in every conceivable direction. A time and condition have been reached, which, in the opinion of a few of the more conservative managers of great financial and industrial operations, calls for a rearranging of lines of action, a recasting of the charts of trade and a revision of plans. These, however, are in the minority. The great body of managers and pushers are too busy with new and inviting schemes and enterprises to patiently consider a scheme to apply the air-brakes; in fact, they are opposed to brakes altogether, and feel that things will take care of themselves. Long-headed financiers rather lean to this view of the case and are quite willing to lose, and loan money; and let obligations of one character or another, pile themselves up millions upon millions until a crisis, a crash comes, when through forced sales the tenders of money will be able to sweep in the pledged properties at enormous sacrifices. They recognize that this has been the course of things ever since the dawn of the commercial age, and while it is to be regretted that such sweeping trade revolutions must come, it is their duty to take advantage of them. The rank and file of business men do not, in the least, suspect such a possibility, much less such a thought on the part of the money-lending interests; but all doubts can be cleared up if the proper source is appealed to. It is the strongly entertained conviction that among a certain class of financiers in high places, that the present hounding prosperity and activity will not continue without interruption. Reference is made to it only that precautionary steps may be taken by those who are in a position to take them. When the actual danger comes, comparatively few will be able to cast anchor. But what is it, it may be critically asked, that is to check existing prosperity and precipitate misfortune? No specific answer need be, or can be made, as every set of new conditions brings different results.

So far as the danger of mere over-production is concerned, it can be measurably guarded against by trade and manufacturing combinations; but when the evil develops itself to restrict consumption, or through a widespread inability to make settlements, then no mere artificial restriction will avail. The chief point to be dwelt upon now is that the money-lending interest contemplate the possibility within a few years of securing much better returns than they now do. Commercial and business enterprise will especially display itself in the year 1889 by seeking new channels of activity. Schemes by the score are coming up, all apparently well capitalized. The managers of the vast coal interests of Northern Alabama are contemplating making New Orleans a coal depot for the Gulf Coast and the West Indies, where the distribution is between three and four million tons per annum, equal to the entire output in Eastern markets of the mountain soft-coal mines of Pennsylvania, Maryland, and West Virginia three years ago. With the completion of the progressing government improvements on the Warrior River, involving the outlay of a half million dollars, the channel will be opened for cheap water transportation for the excellent soft coal or that region to New Orleans, a distance of 450 miles, in place of a dangerous and costly two-thousand-mile float from Western Pennsylvania, the present source of supply. Canal-building enterprises will also receive attention as soon as the purely agricultural and manufacturing interests of the country begin to predominate in the State and National councils over selfish corporate interests. Several thousand miles of canal are already built on paper and filed away until the right hour comes for the smaller interests. Experts in mineral lore believe that the production of precious metals, lead, copper, and even tin, will increase quite rapidly during the next few years. The undesirability of railroad investments has led to numerous large investments in mines and mineral territory in the West and Southwest. The capitalization of new companies within the past four months is moderately estimated at fifty million dollars. The weekly orders for new and expensive mining and milling machinery in our machinery centres show the strength of the movement of capital into this inviting field. It was General Grant who, some years ago, predicted some day an extraordinary development of mineral wealth in the Southwest, and the practical steps taken of late by capitalists in that direction make it look as if his prediction might be verified soon. The opening up of Oriental marts, and the encouragement of the far Eastern nations to adopt the arts and methods and industries of the Western nations, is creating and will continue to create a greater demand for silver especially. Gold follows the behest of commerce, but the drifting tendencies of trade go to show that we will as a nation profit much more in the future with the increasing production of gold than we ever have profited. Considerations of this kind may possibly appear to have no immediate and direct relation to our business affairs, but in truth they lie at the bottom of permanent prosperity. The gold and silver miners of the West are doing more to lay strong trade foundations than the men who build ships and transport shop and factory products to remote lands. Along with this enterprise comes the heretofore recorded development of valuable coal properties, which is leading to hundreds of little shop and factory and foundry industries. Coal and coke will in a year or two be about as cheap, the longer or shorter haul being considered, as in the East. It has been the want of fuel that has held the West back so long, but now that the miners have been encouraged to effort, it is safe to predict that industries that have been hugging the Alleghany Mountains will seek shelter under the shadow of the Rockies.

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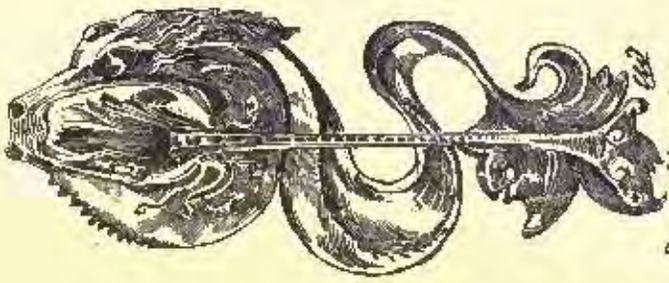

Door-Knocker
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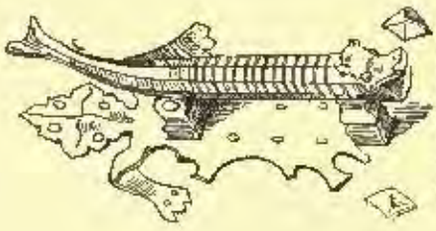
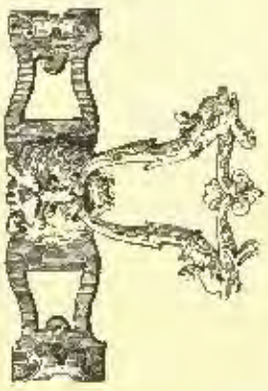
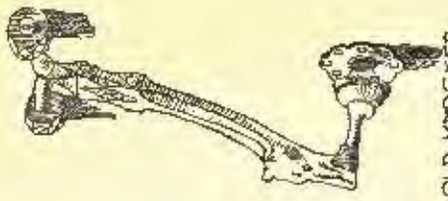
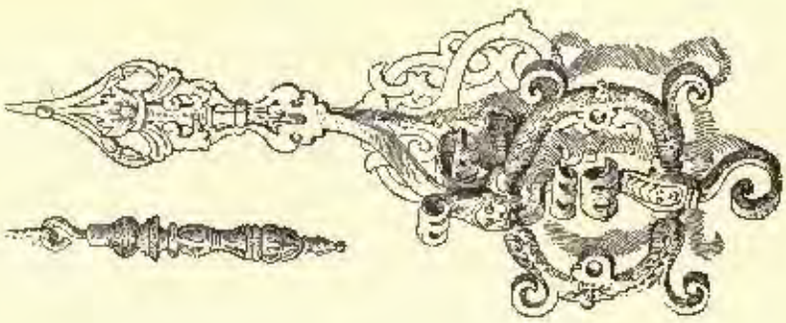


OLD KNOCKER
AT BARCELONA





OLD KNOCKER
AT BEAUNE



KNOCKERS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 690.

MARCH 16, 1889.

Entered at the Post-Office at Boston as second-class matter.

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ACCORDING to the New York *Sun*, the competition for the New York Episcopal Cathedral will be decided before this paper is laid before our readers. We do not feel always quite certain of the accuracy of the *Sun's* information on such subjects, and the account which it gives of the way in which the best designs are to be selected has a rather improbable air, but, as the contest really seems to have closed for the present, we will permit ourselves to make a few remarks upon some of the circumstances that have attended it. In the first place, the "literary bureau" has, to our mind, been altogether too prominent ever since the designs were sent in. Mr. Russell Sturgis's well-meant and interesting description of his idea of a great cathedral, which was published before the drawings were sent in, and thus escapes any imputation of having been circulated *pendente lite*, seems to have served as the text, or rather, as the excuse, for a number of others, which, however innocent the intentions of their authors may have been, are certainly open to that reproach. The variety of these lucubrations seems to have been as admirable as the eloquence with which the opinions contained in them were advocated. One author advised the Trustees, in the most earnest manner, that the "Gothic style was dead, never to be revived," an announcement which will, we imagine, be news to a good many architects, as well as to the Trustees. Another thought that the Byzantine style was the only one which had any claim to consideration for an important American building. In fact, several people had this idea about the Byzantine style, but their notions varied as to what the style consisted in. One writer was sure that, to be architecturally valuable, the Cathedral should be arranged like a Greek church, forming a cross of four equal arms on plan. This disposition, he thought, was not only more truly Byzantine than any other, but it afforded peculiar facilities for gathering a large congregation about a preacher placed in the centre. It did not escape the penetration of this author that a good many Episcopalians do not think that the only object of going to church is to hear preaching, but he contrived to head off unfavorable criticism from such persons by explaining that while a few "Ritualists" might not like a church devoted wholly to congregational purposes, they formed only a small and insignificant portion of the Episcopal communion, and, besides, they might have processions in the side-chapels if they wanted them. Another essayist, while he thought, like the others, that the Byzantine was the only style admissible, considered that even this would not make the church what it should be unless the design comprised a tower four hundred feet high. A fifth believed that nothing but a round-arched design should be thought of, but it might be either Byzantine or Renaissance, and there were advantages in the Renaissance; while a sixth was sure that the Renaissance, of which he mentioned St. Peter's, at Rome, as a conspicuous example, was the only suitable style. It would take too long to mention all the different methods of treatment which were extravagantly lauded in one newspaper or another, and it is hardly necessary to say that, to architects, all the arguments and considerations brought forward were pure rubbish. If they had been of any value, the proper time to advance them would have been six months ago, when the competitors were getting their ideas into shape, and a suggestion that was good for anything would have been welcome; but, coming after all the designs had been sent in, and nothing remained but to judge them, some of them, at least, had an air of attempting surreptitiously to influence the decision, which was very disagreeable. In a shabby, second-rate contest, like that for the Boston State-House, where the quills of the penny-a-liners reinforced to an amazing degree the pencils of the draughtsmen, such things are, perhaps, to be expected; but even in Boston the services of the newspapers were not called in until after the experts had rendered their judgment, and the affair had gone for decision into the hands of the members of the Legislature, who were presumed to be vulnerable to arguments at which an expert would only laugh.

A NEW and important question has come up among the trades-unions. For some time the annual transfer of skilled mechanics from this country to England, and *vice versâ*, has been increasing, until it has come to threaten seriously the power of the Union leaders. Some time ago, when the walking-delegates of certain trades saw fit to keep their subjects idle and poor, while they drew good salaries for talking nonsense, or worse, a considerable number of the victims of this arrangement quietly slipped across the water, and went to work at their trades where they need not fear being denounced to their Union officers and deprived of their living. The result was so encouraging that they repeated the experiment, taking others with them, and the Union discipline has, in consequence, now lost its terrors for many of the more enterprising working members. On the other hand, members of foreign trades-unions about the same time discovered the advantage of a reciprocal arrangement of the kind, and it is becoming a very common practice for English, Irish and Scotch stone-cutters, masons, and carpenters to come over to New York in the spring, spend the summer in working at their trades, without asking leave of any one, and go back in the autumn, with their pockets full of American money, to work in England through the winter, when there would be no employment for them here. A reporter of the Philadelphia *Call* recently made some inquiries about the matter in that city, and found that nearly all the trades were more or less affected by the competition of the foreign workmen. The Union officers were unanimous in the opinion that the "evil" was increasing, and that "heroic remedies" were necessary. What their "heroic remedy" will consist in remains to be seen, but some indication may be found in the resolution which was passed at the Convention of the National Association of Stone-cutters, held the other day, which provided that members "should not visit Europe oftener than once in five years." If such a rule should be enforced, the American workingmen would lose the last prospect of escape from the tyranny of delegates which now remains open to them. This, from the Union point-of-view, would be a great gain, but there seemed to be an idea in the Convention that, if the resolution was passed, the foreign unions would take similar action, and workingmen on both sides of the water would be held captive, for fear that they might interfere with each others' monopoly.

THE *British Architect* publishes a short article on stone-carving, which we hope may be the introduction to a more extended discussion of this very important subject. The writer of the article had, it seems, met a man who had once been a stone-carver, but who had abandoned his profession on account of the difficulties and annoyances connected with it, for which he considered the architects principally at fault. According to him, there are plenty of skilful and artistic carvers to be had, but they get such poor pay, and are treated with so little deference, that they have become discouraged, and either leave the business, or, we suppose, console themselves by turning out the stupid, spiritless work that we usually see. How different things would be if architects did their duty, we may infer from this gentleman's description of the good old times when stone-carvers and architects alike were virtuous and happy. This blissful period coincided with the construction of the Saint Pancras Railway-station in London, when the carvers got fifteen shillings a foot for their labor, and often "drove up in hansoms to their work, and worked only three or four days in the week." Then, also, the carvers did not have to use their brains (if they possessed any, which we should say was doubtful in the case of men who went to their work in carriages),

but did all their carving from models, previously prepared by some one else. Unfortunately, through the machinations of architects, the price of carving is now reduced to twelve shillings a foot, and the men who do it are compelled, like the architects themselves, to work six days in the week in order to get a living. This is the reason, we are told, why the work is done so badly. If architects want good carving on their buildings, the way to get it is to make a contract directly with a carver, give him plenty of money for his work, and plenty of time to do it in, construct a warm and comfortable enclosure for him, and treat him with great deference and politeness. We hope architects will lay this advice to heart. While it may not be perfectly obvious why the work of a man who devotes three days in the week to his business, and the other four to getting drunk, should be so much superior to that of people who keep steadily at their task, it is plain that men work better who have a reasonable amount of comfort about them, and if the carvers are too lazy to get this for themselves, they might as well expect the architect as any one else to provide it for them. As every service on one side, however, implies a corresponding obligation on the other, we hope it is not too much to expect one thing from the persons for whom the architect is to do so much; that is, that they should know something about their business. So far as architects are concerned, there would be no difficulty in having all necessary facilities provided, and a proper price paid, for anything like such carving as they wish to see on their buildings; but in the great majority of cases English and American architectural carving is simply a disfigurement to the building to which it is applied, and the architect's principal anxiety is to get it done as quickly, and with as little elaboration to its ugliness, as possible. Even if it is good, the more quickly it is done the better, and the elegant and well-paid leisure which seems to be so dear to the carver, signifies to the architect the ruin of the effectiveness of his carving by sand-papering and smoothing. This is the real reason why architects who care about the carving on their buildings always want it done rapidly. The examples that they have in mind, the mediæval and early Renaissance details, were done very quickly and cheaply. Perhaps the most beautiful specimens of architectural carving in existence, the capitals at the Castle of Chambord, are known to have cost twenty cents apiece, and it is hard to give up the hope that by limiting the time that a good carver is allowed to devote to the work, he may be forced into the brilliant and effective style of the early sculpture. That the hope is a delusive one most experienced architects know. A few carvers can work effectively with a toothed-chisel and a drill, but they are very few, and even their skill is almost always limited to a set of stock forms, outside of which they are helpless. At present, in this country, what little capacity for carved stone detail once existed seems to be disappearing, under the influence of the gigantic acanthus-leaves which, by the authority of Révoil, apparently, do duty for Romanesque detail. To produce such things there is no need of taste, power of design or knowledge of nature, and those aids to architectural sculpture will probably remain dormant until some change in the fashion shall bring them again into activity. When this happens, we hope the change may be a complete one. Before our architecture can take its place as an art worthy of a great people, it must include beautiful and original sculptured detail. This it has never had, and never will have, until a school of architectural sculpture shall be founded, in which shall be taught, not the art of keeping up a genteel appearance, or of dawdling four days out of the seven, but that of composing and representing natural forms, an art in which no one has yet reached perfection.

A DESCRIPTION of the arrangements for producing and distributing force at the Paris Exhibition is given in *Le Génie Civil*, which will have an interest for those who may have to do with such installations on a large scale. The motive power is to be derived from eleven boilers, placed in the space behind the Machinery Hall. Three of these are English, one Belgian, and the rest French, our own country not being represented in this department. A contract has been made with the exhibitors of these boilers for the supply of one hundred and twenty thousand pounds of steam per hour, to be used not only in the various engines, large and small, which are to be shown in motion, but for other purposes where steam is required. The main engines, which propel the great lines of counter-shafts from which all the small machines not having motive force in themselves take their power, are thirty-two in number. Two of these are American, one from Sweet, of Syracuse, and one, of a hundred horse-power, from Brown, of Fitchburgh, and these will provide the motive power for the American part of the exhibit of machinery. We venture to say that our countrymen will have no reason to be ashamed of the way in which the service is rendered; but they will not be entirely dependent on these, an arrangement having been made by which each section of the great counter-shafts, although ordinarily independent of the rest, can be coupled by means of a sleeve to the neighboring section on either side, so that the movement is kept up, even though the action of its own propelling-engine is suspended. Power enough is kept in reserve, also, for such a contingency. A contract has been made with the exhibitors of the engines for the regular supply of twenty-six hundred horse-power at the counter-shafts, but the engines are amply able to supply double that quantity if required, and a price has been agreed upon at which extra power may be had from any engine. As steam is supplied to the engines, the cost of the power is, of course, only that of oil and attendance, with a certain amount for wear and tear, and interest on the value of the plant. This seems to have been closely calculated by the owners of the engines, and a uniform contract has been made with all of them, by which they agree to furnish the twenty-six hundred horse-power fixed as the normal requirement, dividing the amount among themselves, in proportion to the capacity of their engines, at eight dollars per horse-power for the one hundred and eighty days that the exhibition is intended to last, and for seven hours each day. If extra power is required during the regular exhibition hours, this is to be supplied at six-tenths of a mill per horse-power per hour, and, if the duration of the exhibition should be prolonged, the price of power is to be one mill per horse-power per hour. The counter-shafts are arranged in four lines through the building, their total length being a little over a mile. As with everything else, a contract has been made for the erection and use of these shafts, including supervision and oiling, at something less than thirteen dollars for the intended duration of the exhibition for each metre in length of shaft. If more than seven hours' service per day is required, a small sum is to be paid extra for surveillance and oiling, and for every day of prolongation of the exhibition the price per metre per day of seven hours is to be eight cents. To give suitable facilities for supplying the boilers with water and the engines with steam, and for carrying off the condensed water from the exhausts, if that should be required, a subway has been built, in which run three pipes. One of these, two feet in diameter, carries cold water to the boilers from the Seine; another, of the same diameter, serves as principal steam-main, and the third conveys the condensed water. A similar subway, parallel with the first, contains a group of smaller pipes, and branches extend to the various engines, the whole length of subway being about a mile.

THE foreign papers have a good deal to say about Signor Brentano, the winner of the first prize in the competition for the completion of the Cathedral of Milan, and the author of the design adopted for execution. He is, as it seems, a very young man, being only twenty-four or five years old, and this is naturally his first important work. A few years ago he was a student at the Higher Technical School at Milan, being maintained there, if we are not mistaken, by the town of Sicna, his native place. While at the school he was under the instruction of Professor Beltrami, also one of the favored competitors for the Cathedral, and seems to have imbibed his master's ideas. On leaving the school, three years ago, he competed for a travelling-scholarship offered by the town of Siena and won it, and the Cathedral competition being just at that time announced, he resolved to devote his tour to the study of cathedral architecture, with a view to entering the competition. The success of his efforts has made him famous throughout the civilized world, and nothing remains but the execution of the work, which we hope will not be long delayed, to place him among the foremost architects of the century. Singularly enough, his design and that of Professor Beltrami were very much alike, both of them having devoted themselves to the production of an elaborate façade, following the outline of the building behind it, without any addition of towers or screen-work. Professor Beltrami, indeed, placed a detached campanile by the side of his design, but this was rather an independent suggestion than a part of the design.

BUILDERS' HARDWARE.[1]—XXI.

FRONT-DOOR LOCKS.

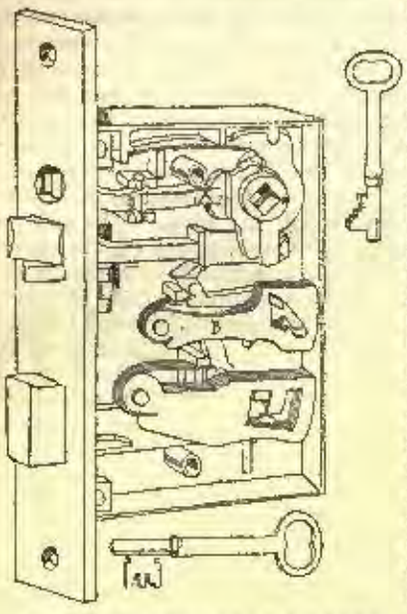


Fig. 317. Front-Door Lock. P. & F. Corbin.

THE greatest amount of care and ingenuity has been expended upon the locks which are used for the front-doors of dwelling-houses, and the largest degree of complication is usually found in those goods. They afford, generally speaking, a greater security against picking than do the locks which are employed for inside-doors. The conditions of an outside-door lock are that it shall have two sets of mechanisms operated by keys, to move either bolt or latch at will, and shall have the knob-spindle so arranged that the latch can be moved by turning either knob, and that the outside knob can be made immovable, while the inner one is free to move. Front-doors are usually two inches or more thick, and the lock can consequently be made quite thick, so as to permit of multiplication of the levers, and a stronger mechanism than for inside-doors. A front-door lock should always have an anti-friction strike.

Figure 317 shows a form of front-door lock manufactured by P. & F. Corbin. This is fitted with an anti-friction strike, and has four levers each for the lock and the night-latch. The follow is in two pieces. When the small catch on the face-plate over the latch is shoved to one side, the lever, *A*, is moved so as to fit in a slot on the side of the outside follow, as shown by the figure, thus holding the follow, and with it the outside-knob and spindle, so they cannot be moved. The night-key operates by first lifting the levers *B*, and by moving the lever, *C*, which carries back with it the latch-bolt. Figure 318 is a form of rebated-door lock by the same manufacturers. It is inserted here merely to show the manner in which mortise-locks are fitted to a rebated-door.

Figure 319 illustrates a front-door lock manufactured by Russell & Erwin. The levers on the locking-bolt, *A*, are attached to the bolt, and move with it, not being particularly proof against picking, however. In operating the night-latch, the levers *B* are pushed to one side until the gatings are on a line to permit the post, *C*, to pass, the post forming part of a bent lever, the end of which shows at *D*, which portion acts directly against *E*, and so draws back the latch. In order to secure the outside knob, the catch on the face-plate is pushed up, throwing the slots on the lever *F*, *F* over a shoulder on the outside-follow. Figure 320 is another front-door lock by the same manufacturers.

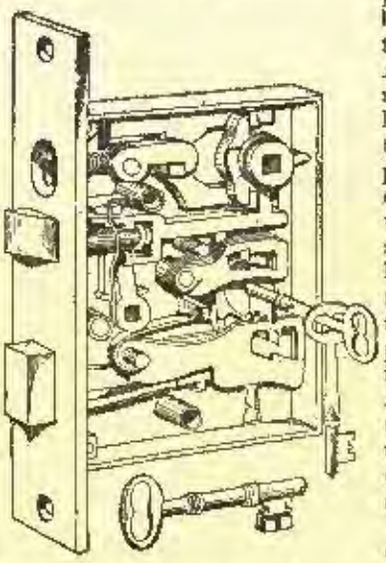


Fig. 319. Front-Door Lock. Russell & Erwin.

Figure 321 is a very excellent lock manufactured by J. B. Shannon & Sons, so arranged that the knob comes between the night-latch and the lock-bolt. It will be noticed that the levers and the posts are notched in the same manner as was explained for some of the dead-locks. The latch is moved by means of a lever, *A*, underneath the upper set of levers, *A* being attached to the latch-bolt. This is a very secure lock.

Figure 322 shows a variety of the "Niles" front-door lock, which is quite simple in its arrangement. The latch is worked by the lever *A*.

A very simple but efficient lock is shown by Figure 323. The latch-key works through a curtain. *A*, raising the levers until the post, *B*, and with it the plate *C* and the latch can be drawn back. This lock is made in the "New York" style, with a single follow, intended to receive the spindle of the inside-knob.

Figures 324 and 325 illustrate two styles of front-door locks by the Hopkins & Dickinson Manufacturing Company. The former is rather a light lock, the latter especially strong and heavy, and fitted with five levers to both latch and lock.

Figure 326 shows one of the best of the front-door locks,

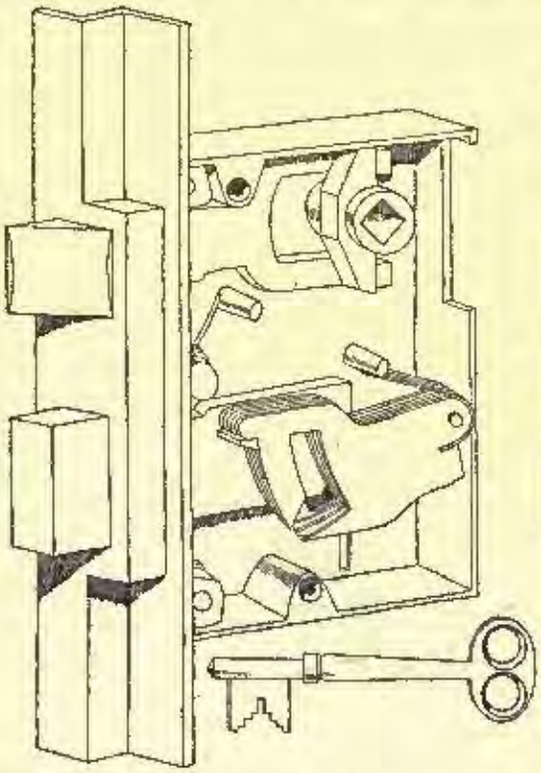


Fig. 318. Mortise Knob-Lock. P. & F. Corbin.

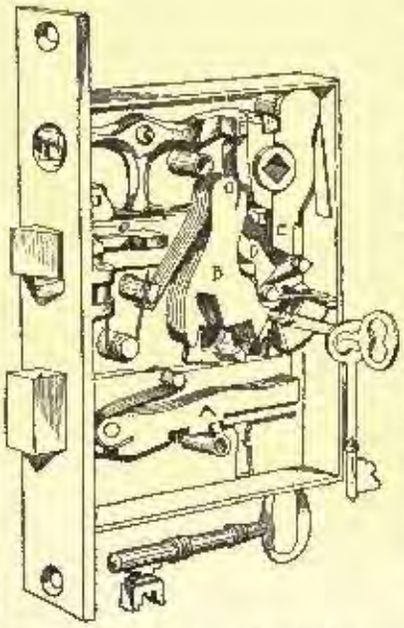


Fig. 320. Front-Door Lock. Russell & Erwin.

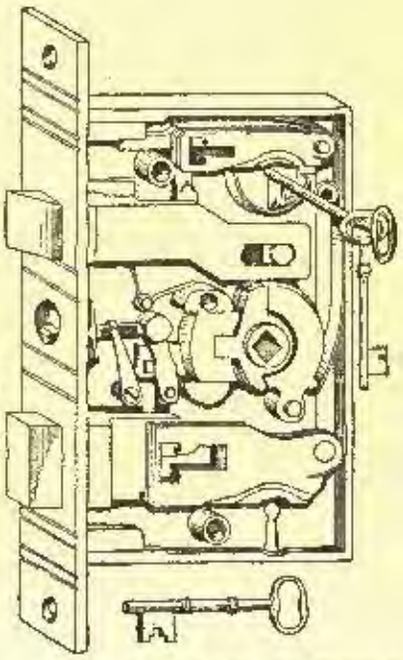


Fig. 321. Front-Door Lock. J. B. Shannon & Sons.

[1] Continued from page 112, No. 689.

the "Standard," by the Yale & Towne Manufacturing Company. There are three steel levers for both the latch and the lock. The night-key pushes the levers *B* to one side and moves the bent piece *A*, which forces back the latch-bolt. The tongue, *C*, which locks the outside-knob, is pushed in or out by the buttons on the face-plate. It is not intended to use this lock with a swivel-spindle, but when the knob is locked by the tongue *C*, a spindle and cam at *D* serve to throw back the latch from the inside of the door. The arrangement of the levers *B* is defective in this lock, in that they will not work should the springs give out. Levers which act by gravity, as well as with springs, would seem to be more suitable.

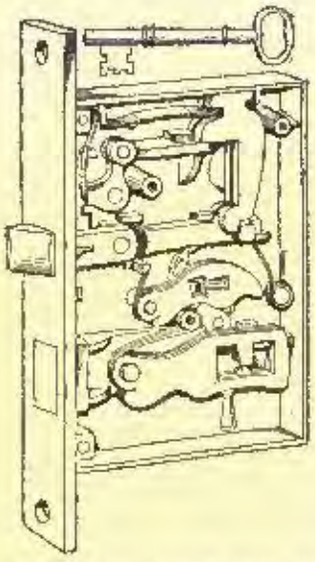


Fig. 322. Nitta's Front-Door Lock. Chicago Hardware Co.

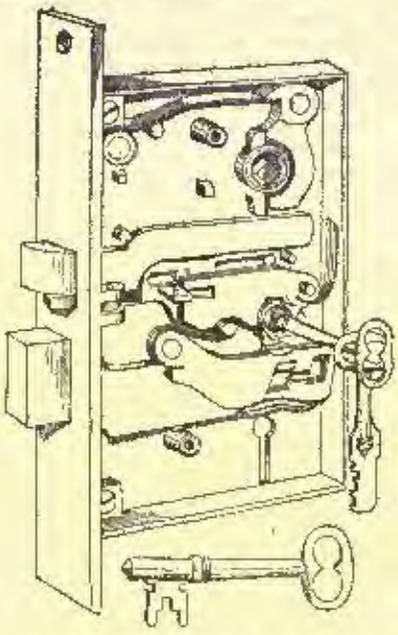


Fig. 323. Front-Door Lock. A. G. Newman.

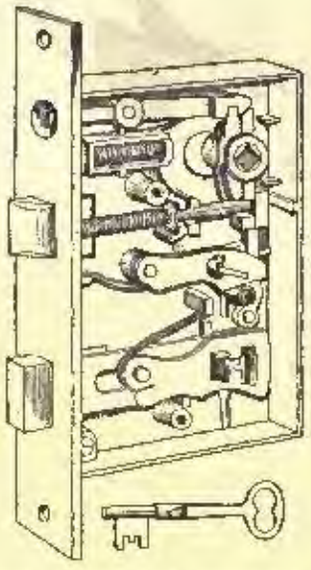


Fig. 324. Front-Door Lock.—Hopkins & Dickinson Mfg. Co.

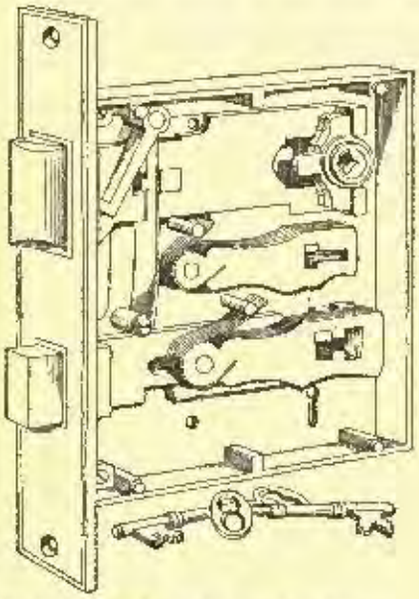


Fig. 325. Front-Door Lock. Hopkins & Dickinson Mfg. Co.

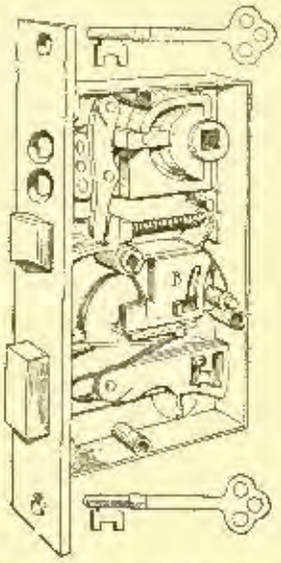


Fig. 326. Yale Standard Front-Door Lock. Yale & Towne Mfg. Co.

The lock represented by Figure 327, is one of "Robinson's" best make, being sold, with the corresponding vestibule lock, at $14 per set. It is a hand-made lock, all the mechanism being of brass. In the examples previously considered, there have been two sets of levers to each lock. In this case, however, there is but one, the holes for the night-latch and the dead-lock key being side by side. The shape of the levers will explain the arrangements, two sets of gatings and rackings being cut on each. The dead-lock key acts against the edges at *A*. *B* is the post on the bolt-tail, which passes through the gatings in the ordinary manner. The night-key acts against the edges *C*. The post *D* is attached to a sliding-plate, working between the levers and the dead-bolt tail. The lever *E* is pivoted to this plate and also to the lock-case. When the levers are raised so as to allow the post *D* to enter the ratchings, the plate and the lever *E* are drawn back together at the same time as the latch. The follow is made double, to permit of swivel-spindles, and the outside is locked by the arm *F*.

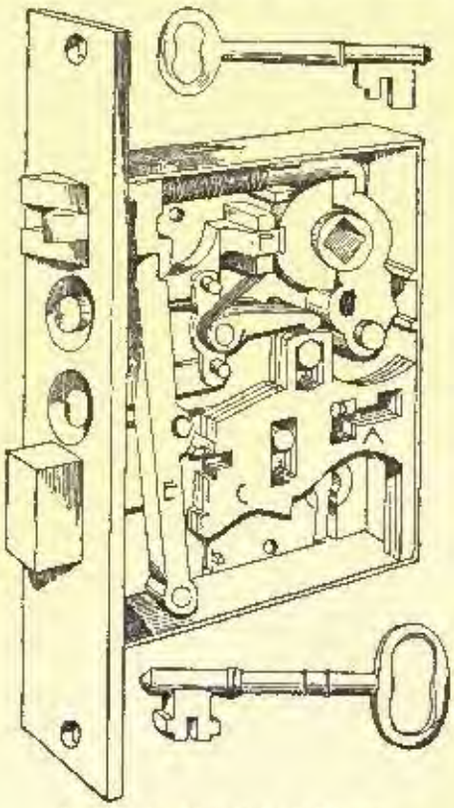


Fig. 327. Front Door-Lock. E. Robinson.

The latch has a very easy spring, the follows being stiffened by a spring beneath *G*.

Hall manufactures a front-door lock almost exactly like Figure 327, but with his peculiar anti-friction strike.

(To be continued.)

ARCHITECTURAL SHADES AND SHADOWS.[1]—II.

CHAPTER II.—GEOMETRICAL CONSIDERATIONS.

Fig. 12

Line of Shade abcd of Sphere is a great circle: its Shadow a'b'c'd', on a plane is a circle or ellipse

16. We have already observed that that part of the surface of any opaque body which receives light from the sun at any one time is said to be *in light;* the unlighted part is said to be *in shade*, and the mathematical line separating the two is called the *line of shade*. That portion of space lying behind the object, and from which the rays which light the object are excluded, is called its *shadow in space* or *invisible shadow*. Whenever this or any portion of it is crossed by an opaque surface turned towards the sun, the light is excluded from so much of this surface as intersects the shadow, while the rest remains illuminated. The darkened portion of the surface is called the *visible* or *cast shadow* of the object, and its outline the *line of shadow*.[2] Fog, smoke, or dust will render these invisible shadows visible by filling the air with countless microscopic particles of vapor or solid matter, a part of which remain in the darkness of the shadow in space while the rest are in light.

17. The form of a cast shadow is evidently that produced by the intersection of the surface on which it falls (sometimes called the *surface of incidence*) with the invisible shadow. The latter is, in the case of a sphere, for example, a solid circular cylinder of indefinite length. If the surface of incidence is a plane, its intersection with this cylinder must be bounded by a circle or ellipse, which is therefore always the form of the shadow of a sphere upon a plane (Figure 12).

18. Now if we imagine the body that casts the shadow to be infinitely small — in other words a point — its cylinder of invisible shadow becomes a mere line, and its cast shadow is reduced to a point. The shadow-in-space of a line is a *surface* whose elements are the *invisible* shadows of all the points composing the line; its

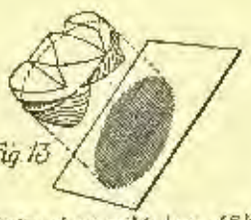


Fig. 13

Shadow always cast by Line of Shade, hence unchanged by disfiguring the object if Line of Shade is intact.

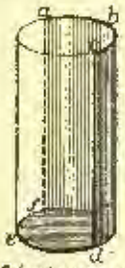


Fig. 14

Line of Shade of Cylinder composed of two half circles abc, def, and two right lines af, cd.

cast shadow is a *line* composed of the *cast* shadows of all these *points*. Returning now to our illuminated sphere, it is easy to perceive that every point of its line of shade casts a shadow which is a point of the outline of shadow of the sphere. This outline of shadow depends therefore wholly upon the line of shade for its form upon any given surface of incidence, and the same is true of the shadow-in-space whose surface is composed of the invisible shadows of all the points of the same line of shade. This is very important to note, for it reduces the whole problem of sciography to the finding of the shadows of lines of shade only. No matter how irregular or complicated the surface of an object may be, its form need concern us no further than is necessary for ascertaining its line of shade. When the shadow of this line is found, the problem is solved. Thus the sphere shown in Figure 12, may be disfigured out of all recognition, as in Figure 13, yet if the line of shade is not touched but remains still a circle, the cast shadow will remain unchanged, a circle or ellipse. The problems of sciography are greatly simplified by bearing constantly in mind that there is no question of the shadows of surfaces or solids, but only of the shadows of lines. Even the problem of finding the shadow of a point is solved by finding the shadows of any two lines passing through it.

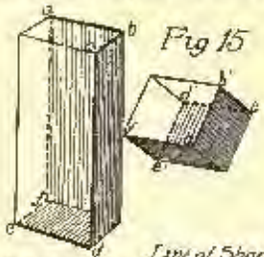


Fig. 15

Line of Shade of Parallelopipedon composed of six right lines ab, bc, cd, de, ef, fa.

20. The line of shade of any solid or surface is a line passing through all the points at which the rays of light are tangent to the surface. To find and draw these points and this line, is a problem of pure descriptive geometry which will be fully discussed later. But in the case of many solids composed of geometric elements it can be at once determined, by observation of the nature of these geometric elements and their relation to the light. Thus the line of shade of a sphere in any position is a great circle perpendicular to the rays of light. The line of shade of a cylinder is composed of the two opposite half-circumferences of its two bases, and the two rectilinear elements of the cylinder joining them (Figure 14). So of a parallelopipedon, the line of shade is evidently, in most positions, composed of six lines, viz.; two adjacent edges of each base, and the two parallel edges connecting them (Fig. 15). And in case of any finite solid, the line of shade must be a continuous and complete figure.

21. The case of plane figures offers some peculiarities worth noticing. We shall for the sake of convenience and analogy treat them as having two sides or faces, and edges of infinitesimal thickness, or in other words, as very thin discs.

a. When such a disc is normal to the direction of the light, one face is light, the other dark; the whole edge or perimeter becomes its line of shade, having a cylindrical[3] surface for its invisible shadow and a figure for its cast shadow (Figure 16, *A*). When it is inclined to the rays of light, a part of its edge is light and the other dark, and the short elements separating these two portions, form

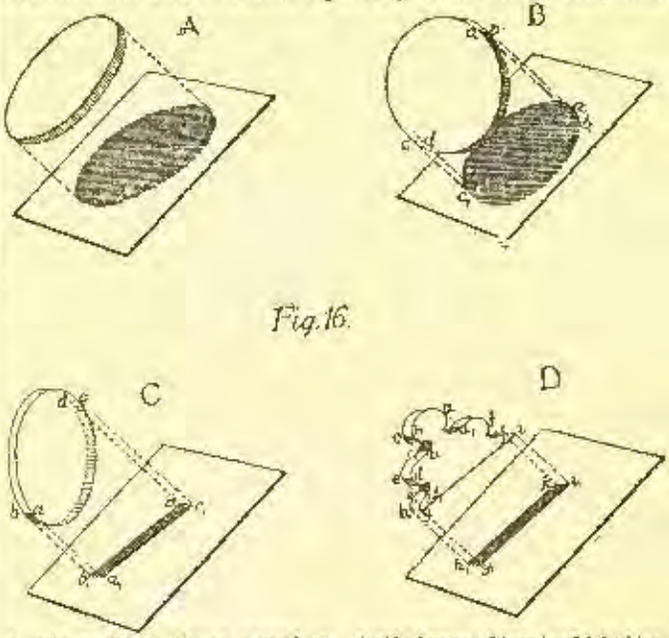


Fig. 16.

A. Disc or Plane Figure normal to Light.
B. The same, oblique to Light.
C. The same in the Plane of the Light: its Shadow on a Plane is a Right Line.
D. Plane Figure casting Shadows on its own Edge: *a,b,c,d,e,f,* are Shadows of *abcdef*.

Note:—When disc becomes a plane figure, the short elements *ab, cd,* on its edge (B) with their shadows *a'b', c'd'*, lose their significance unless the figure is in the plane of light (C) when these shadows mark extreme points of the whole shadow.

part of the line of shade, their shadows being those of straight lines connecting the shadows of the *two* opposite half-perimeters which complete the line of shade (*id., B*). But in the true plane figure these become mere points, important only as the rays passing through them mark extreme points of the cast shadow.

b. When such a disc is in a plane parallel to the direction of the light (*i. e.*, a plane one of whose elements is parallel to the rays of light) the only light it receives is on its edge, part of which is in light and part in shade, separated from each other both by the elements *e e* of the edge where the rays are tangent to it, and by the two faces of the disc, which are in shearing light, and form in reality a part of the "line" of shade (*id. C*). In a real plane figure we have a curious anomaly; these two faces coalesce; the lighted edge, like the shaded edge, becomes a mathematical line, and the short elements that divide them are mere points; hence *the whole figure is its own line of shade;* the invisible shadow is a plane coinciding with that of the figure itself, and its cast shadow a line or figure lying in that plane; a right line, indeed, where the surface of incidence is a plane. The short elements *e, e,* that divide the light from the dark edge are significant points, their shadows being the extremities of the dark shadow of the figure.

c. When the figure is irregular, these points of tangency may be numerous, with shadows sometimes falling upon the edge of the figure itself, and sometimes outside of it (*id, D*). All these considerations are extremely important, as they form the foundation of the "Method of Slicing" to be described in a future chapter, by which the shade and shadow of any geometrical solid may be found.

22. The following maxims resume the preceding considerations:

VII. The invisible shadow of a point is a line, and its cast shadow a point.

VIII. *a.* The invisible shadow of a line or figure is a surface, and its cast shadow a line or figure.

b. The invisible shadow of a right line is a plane, and its cast

[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 90, No. 687.

[2] Lunar eclipses are caused by the moon's entering the invisible shadow of the earth, so that the illuminated side of the moon is partly or wholly covered by the earth's visible shadow. They can only be witnessed by persons on the side of the earth that is *in shade*: i. e., at night.

[3] A cylindrical surface in geometry is a surface generated by the movement parallel to itself of a right line, not necessarily in a circle, but along a path or directrix which may be any curve. The circular cylinder is only a special form of cylindrical surface.

shadow a right line when cast upon a plane. In all other cases it is a plane figure, lying in the plane determined by the line itself and the rays passing through it; that is, in the plane of invisible shadow.

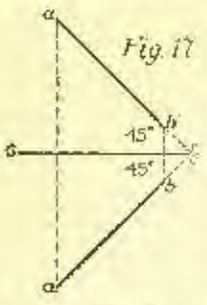
IX. *a.* The invisible shadow of a plane figure is a surface, cylindrical or prismoidal, and its cast shadow a figure, except when the figure lies in a plane parallel to the light.

b. In this case its invisible shadow is a plane, coinciding with that of the figure. Its cast shadow is a figure lying in this same plane, and, when cast upon a plane, a right line.

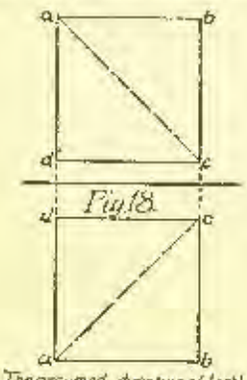
X. The shadow of a solid is the shadow of its line of shade.

23. We are now prepared to take up those considerations especially relating to architectural shades and shadows. Attention has already been called to the precise and conventional treatment in architectural drawings of the phenomena of intensity of light, shade and shadow, as well as of those relating to the direction of the light (4). The former have been treated with some fulness; the direction of the luminous rays remains to be considered.[1]

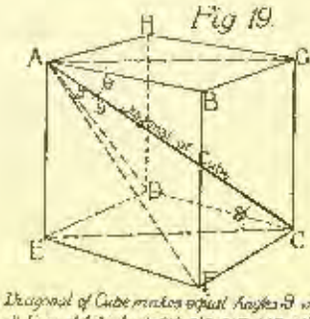
24. In accordance with universal practice, the direction of the light in architectural plans, elevations, and sections is assumed to be that of a line inclined downward to the right and towards the picture at such an angle that both its projections are inclined at 45° to the ground-line (*ac*, *a'c'*, Figure 17). This is the direction of one of the diagonals of a cube whose faces are respectively parallel and perpendicular to the planes of projection, and which we shall hereafter frequently refer to as a "principal cube." For in the cube *obed*, *o'b'c'd'* (Figure 18), which is so situated, the projections of the diagonal from the left-hand upper near corner *oo'* to the lower right-hand farther corner *cc'* are diagonals of the squares which represent the cube, and, therefore, inclined at 45° to *ed*, *e'd'* and *GL*. But this, as already remarked, is the assumed direction of the light.



25. This angle of 45° is the projection of the real angle made by the ray with either plane of projection, or, in other words, of the angle made by the diagonal of a cube with any of its faces, to all of which it is equally inclined. This is evident from an inspection of the figure, bearing in mind the fact that the angle of inclination of a line to a plane is always measured in a plane normal to the latter.



The assumed direction of Light is that of one Diagonal of a Cube.



Diagonal of Cube makes equal Angles θ with all faces of Cube Angle OD'-AD-CAF-ACF-35°15'.

Now, if we take the side of a square as unity, its diagonal will be measured by $\sqrt{2}$, (1.4142), and the diagonal of the cube constructed upon this square by $\sqrt{3}$, (1.732). The angle θ, made by this diagonal with either face of the cube, will then be the angle whose tangent is $\frac{1}{1.4142}$ or .707153, which is the natural tangent of 35° 15', very nearly. This angle is easily constructed at any point of a line, as *C* (Figure 20), by the following process: Erect at *C* a perpendicular of convenient length, *CD*, and complete the square *CDEF*. Draw *CE* and revolve it down upon *AB*; *E* becomes *E'*. Now complete the rectangle *CDGE* and draw *CG*: *GCE* will be the angle required, *GE* and *CE* being respectively equal to the side and diagonal of the square of *CD*. A pasteboard triangle similar to *GCE* will, however, save the trouble of geometrically constructing the angle θ.

26. The three sides of such a triangle, corresponding respectively to the edges of a cube, the diagonals of its faces and its own diagonals, hold, therefore, to each other the simple and easily-remembered relation of $\sqrt{1}$, $\sqrt{2}$, and $\sqrt{3}$. When the base (instead of the short side) equals unity, the short side is equal to $\frac{1}{\sqrt{2}}$ or $\frac{1}{2}\sqrt{2}$, and the hypothenuse to $\sqrt{\frac{3}{2}}$. When the hypothenuse equals unity, the short side equals $\sqrt{\frac{1}{3}}$ or $\frac{1}{3}\sqrt{3}$, and the base $\sqrt{\frac{2}{3}}$ or $\frac{2}{3}\sqrt{\frac{3}{2}}$.[2]

27. Hereafter the angle 35° 15' will in these papers be called the *angle θ*. The square constructed upon a given line as its side will be called the *square of the line*, and its diagonal the *diagonal of the line*. The latter term will also be used, when necessary, as a *measure of length*, the diagonal of a line being equal to the line multiplied by $\sqrt{2}$.

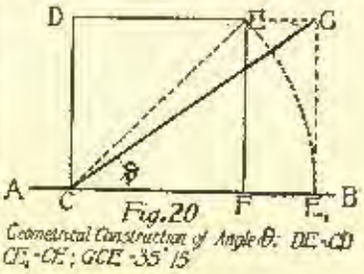
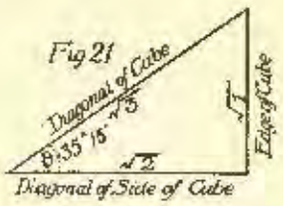
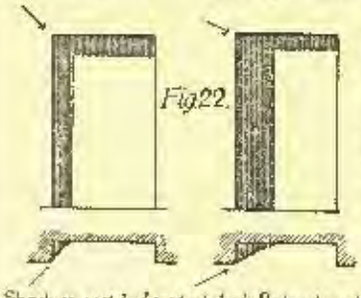


Fig. 20

Geometrical Construction of Angle θ. DE=CD CE'=CE'; GCE=35°15'



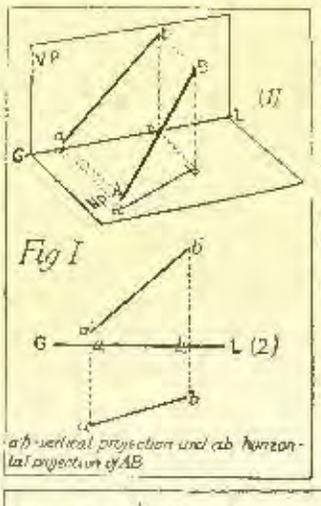
28. The advantages of taking the light at this angle can be indicated here only in part. Chief among them is the fact that the widths of the shadows cast by architectural features become thereby true measures of the amount of relief or projection of these features from the surface of incidence. Consequently, horizontal and vertical architectural members projecting or retreating equally from a vertical wall or other surface, as the jamb and lintel of a door, cast shadows of equal width upon it, which can only happen when the light falls at an angle whose vertical projection is 45°. In all the other cases the widths of the shadows are wholly misleading as indications of the amount of relief or projection (Figure 22). The incidental advantage derived from the use of the 45° triangle alike for the horizontal and vertical projections of the ray is by no means an unimportant consideration.



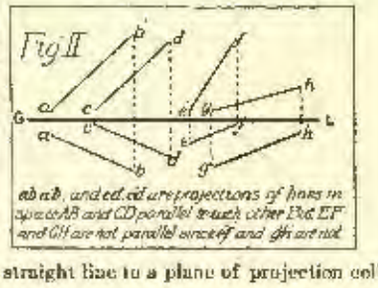
Shadows cast by Light at Angle θ show proper true Measure of Projection or Depth of Architectural Features.

We are now fully equipped for the encounter with the problems of architectural sciography. The next chapter will discuss the general method.

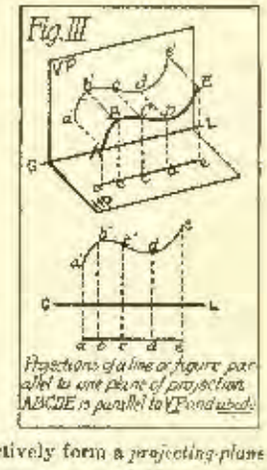
NOTE. Figure I (1) represents in perspective a portion of two planes of projection commonly employed in descriptive geometry. *HP* is the horizontal, and *VP* the vertical plane, and their intersection, *GL*, is the ground-line. Let *A* and *B* be two points in space; *a* and *b* are their horizontal, and *a'* and *b'* their vertical projections. *ab* and *a'b'* are the projections of the line in space, *AB*. The lines dropped from a point in space to its projections on either plane are called *projecting-lines* (*Aa'*, *Aa*; *Bb'*, *Bb*); they are normal to these planes, and are themselves projected as lines perpendicular to *GL* (*aa'*, *a'a*; *bb'*, *b'b*). The projecting-lines of all points in a straight line to a plane of projection collectively form a *projecting-plane*.



a'b' vertical projection and ab horizontal projection of AB



ab ab, and ed cd are projections of lines in space AB and CD parallel to each other But EF and Gh are not parallel since ef and gh are not.



Projections of a line or figure parallel to one plane of projection. ABCDE is parallel to VP and abcde.

[1] In the discussion of this topic and those that follow, the reader is supposed to be familiar with the rudiments of descriptive geometry. Those who desire to refresh their memories in regard to such of these rudiments as are necessary for understanding these discussions will find them in a note at the end of this chapter, embodied in the form of maxims, for whose demonstration they are referred to the text-books on the subject.

[2] It is worth remembering that the reciprocal of the square-root of a quantity is equal to the square-root of its reciprocal, and to its own square-root multiplied by its own reciprocal. Thus, $\sqrt{\frac{3}{4}}$ = reciprocal of $\sqrt{\frac{4}{3}} = \sqrt{\frac{4}{8}} = \frac{4}{3}\sqrt{\frac{3}{4}}$.

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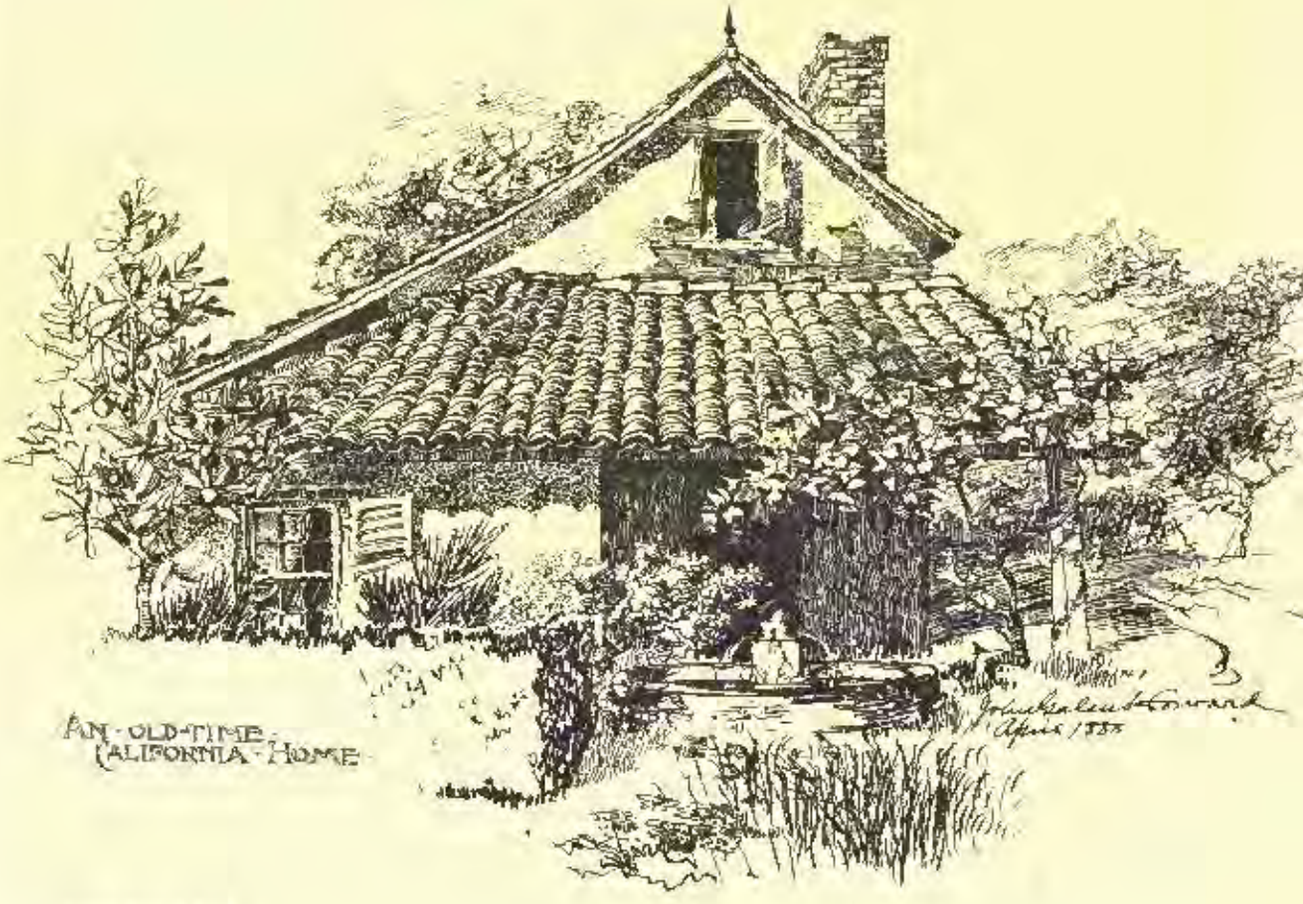

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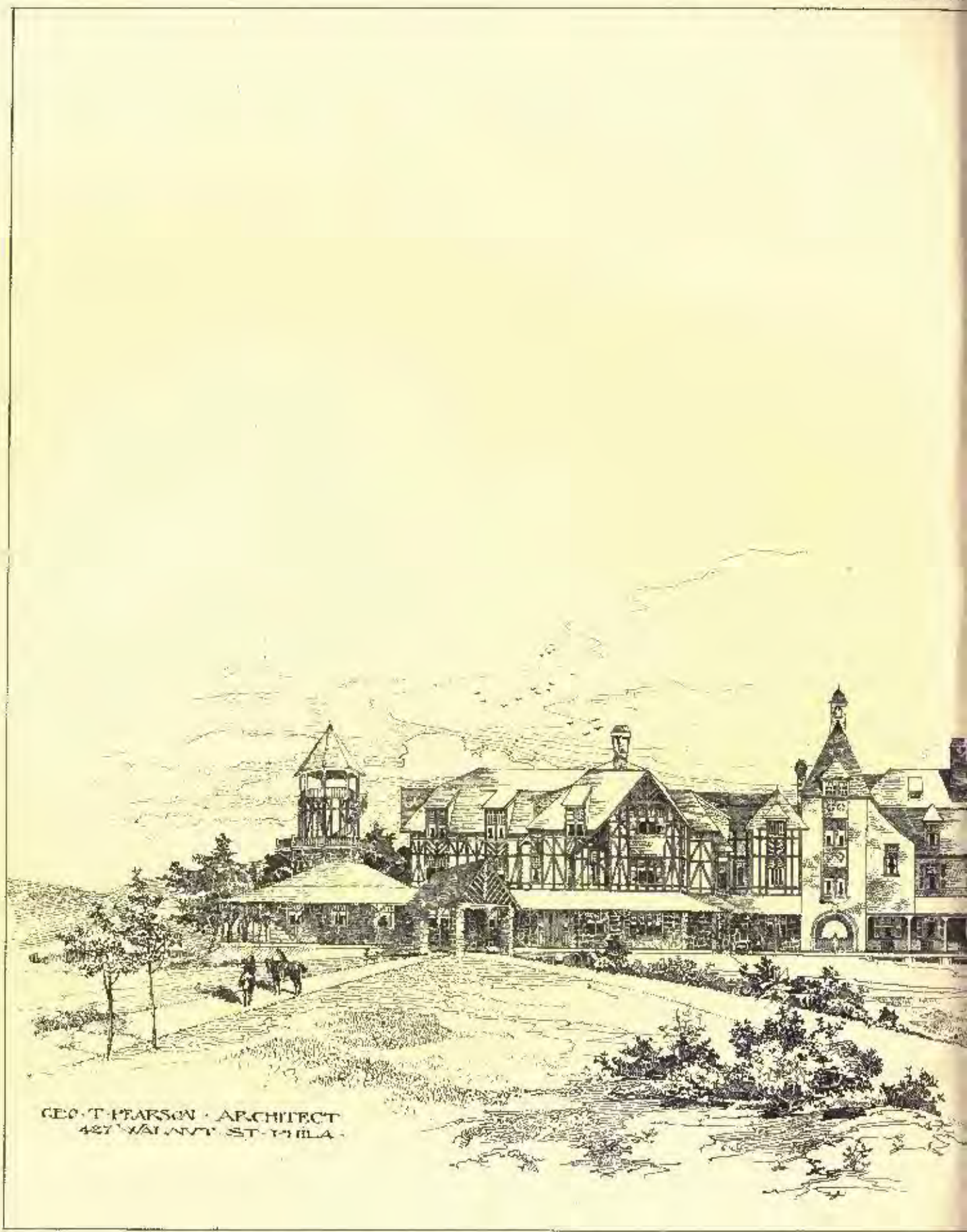
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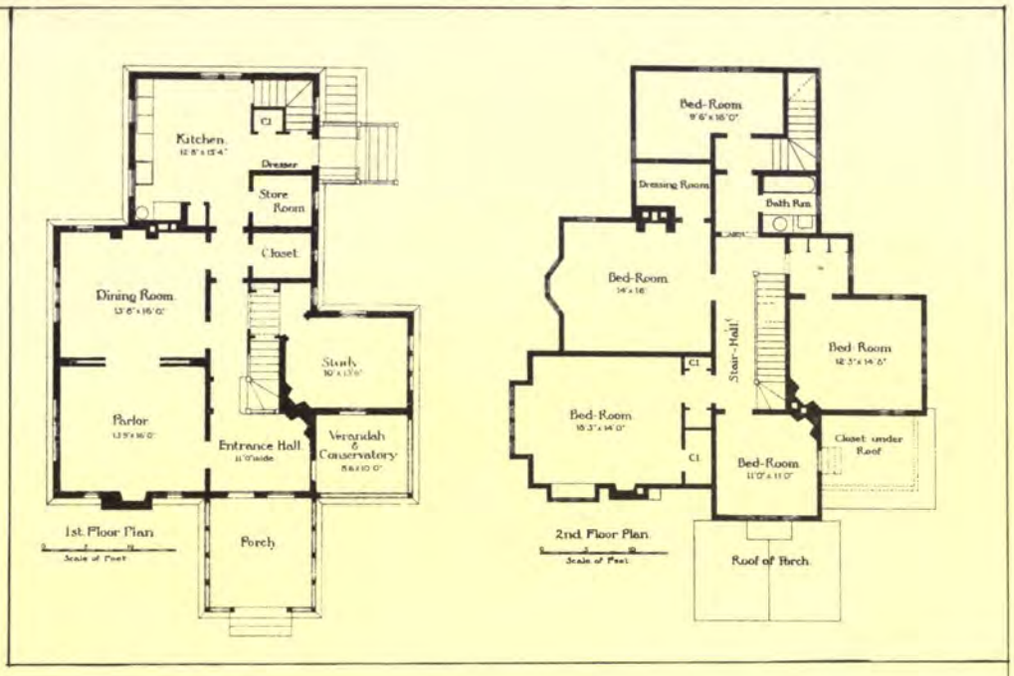

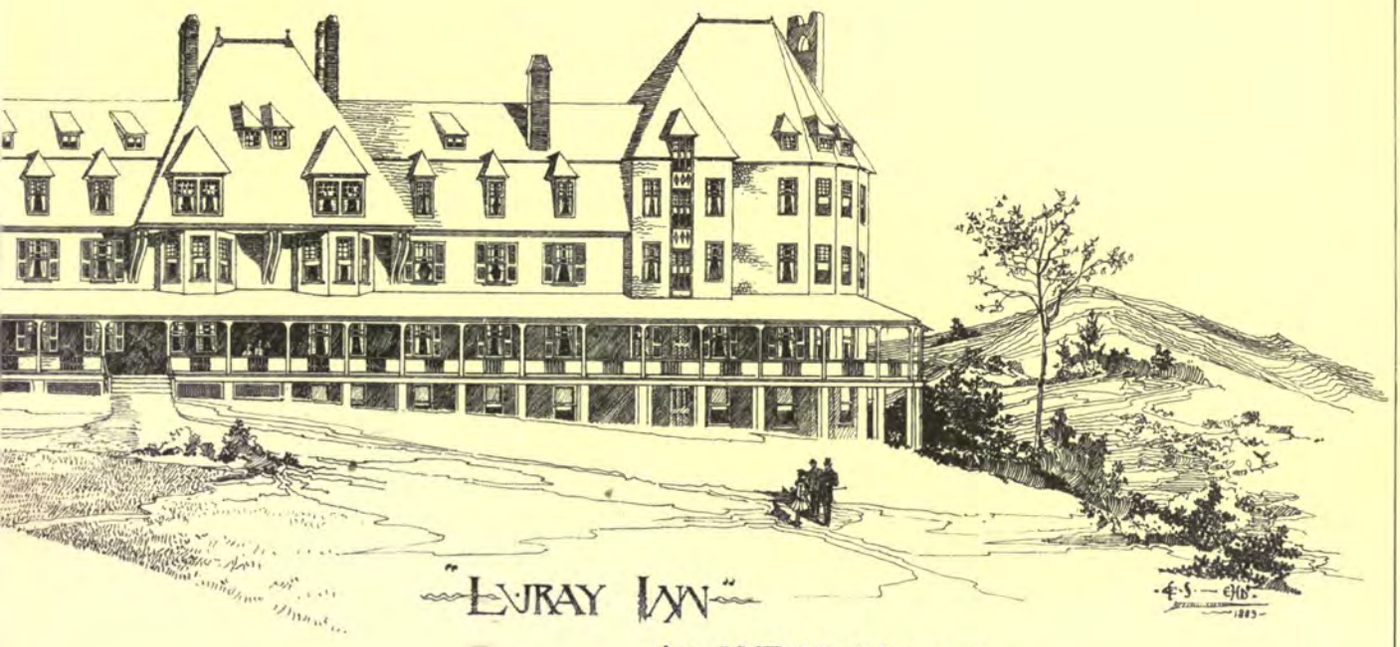

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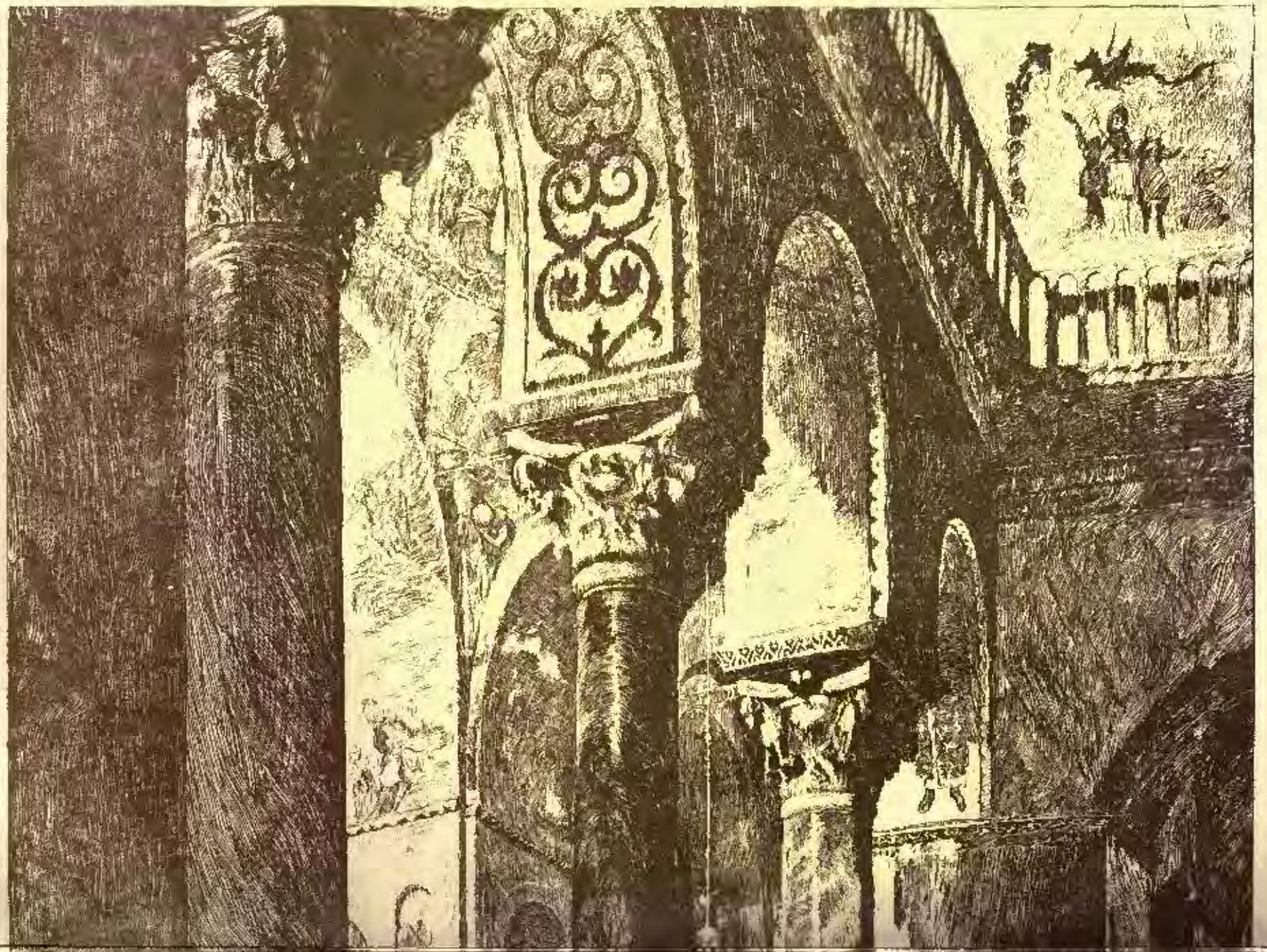

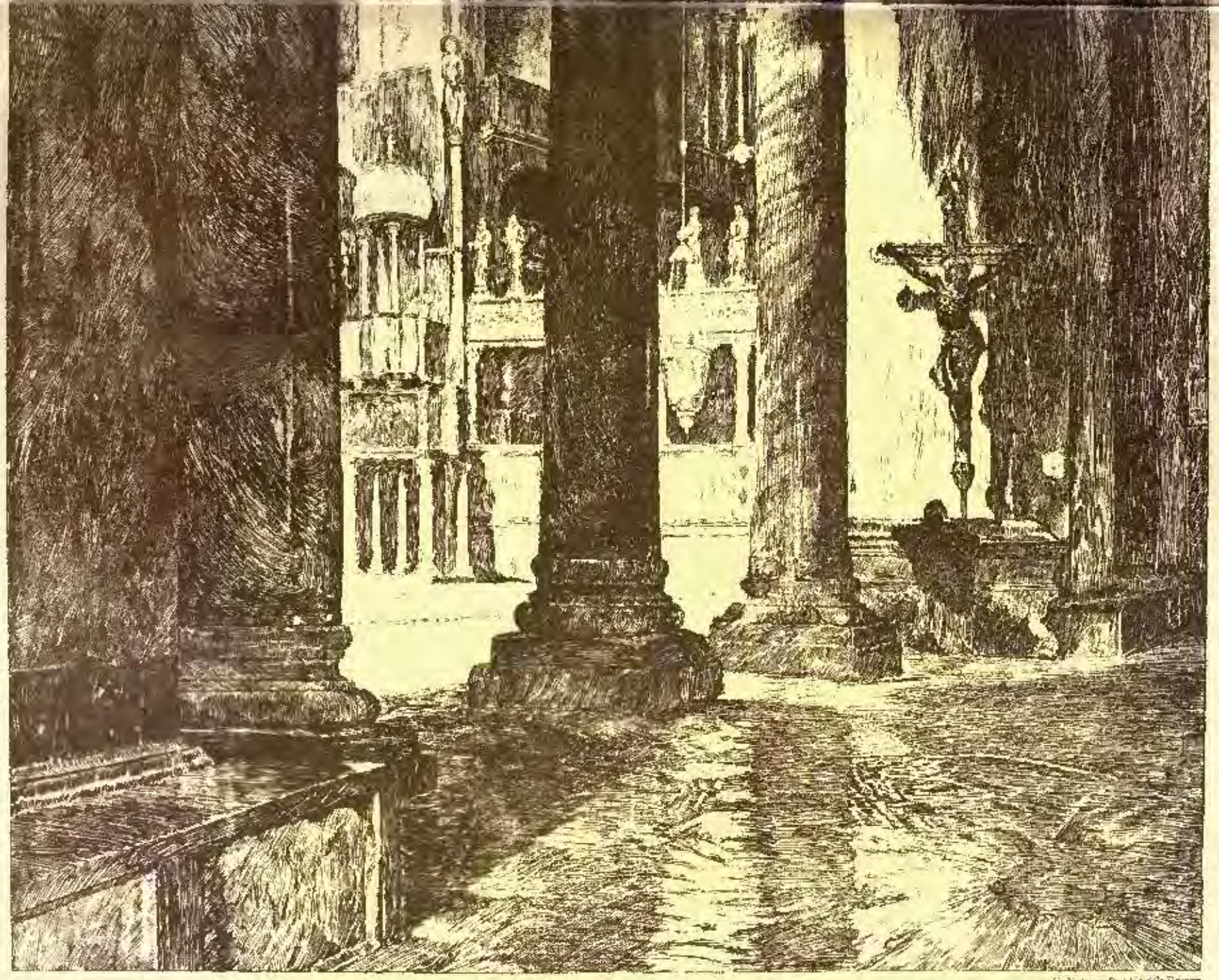

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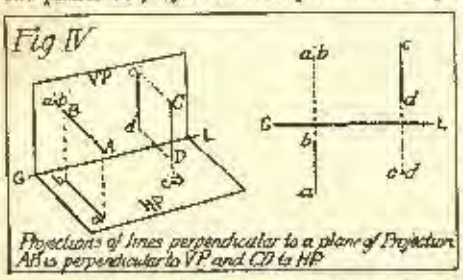
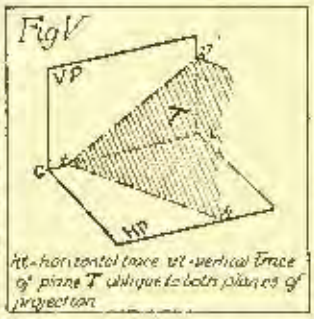
perpendicular to the plane of projection. In descriptive geometry the two planes of projection are represented as opened apart, so as to coincide with the plane of the paper, being separated by the line *GL*, as shown in I (2). Lines and points in space are designated by capital letters, their projections by small letters.



Projections of lines perpendicular to a plane of Projection. AB is perpendicular to VP and CD to HP

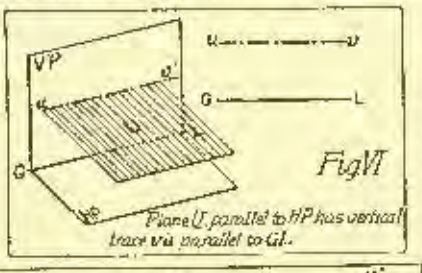
1. The two projections of a point are points lying in the same straight line perpendicular to *GL*. The projections of a right line are determined by the projections of any two points of that line; and the projections of a point are the intersections of the projections of any two lines passing through it.



ht-horizontal trace vt-vertical trace of plane T oblique to both planes of projection

2. The projections on either plane of projections of parallel lines are parallel. Conversely, lines whose projections in *both planes* are respectively parallel are parallel to each other. In Figure II, *ab*, *a'b'* and *cd*, *c'd'* are projections of parallel lines, *AB* and *CD*; but *EF* and *GH* are not parallel because their vertical projections *e'f'* and *g'h'* are not parallel.

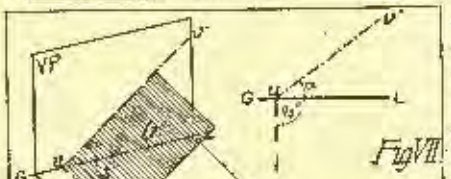
3. If a line or plane figure is parallel to a plane of projection, its projection on that plane is a line or figure equal and parallel to itself; upon the other plane it is a right line parallel to *GL* (Figure III). If a line is parallel to both planes of projection, itself and both its projections are parallel to *GL*.



Plane U parallel to HP has vertical trace vu parallel to GL.

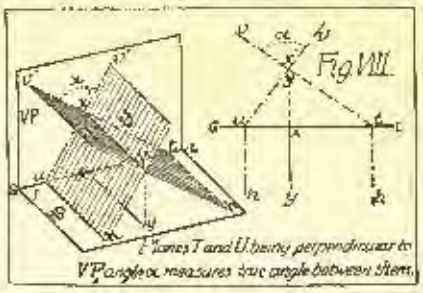
4. If a line is perpendicular to one plane of projection it is parallel to the other. Its projection on the former is a point; on the latter it is a line perpendicular to *GL*.

5. Every imaginable plane must cut one or both planes of projection in a line or lines called traces. (*a*) If a plane *T* is oblique to both planes of projection its traces *ht* and *vt* are oblique to *GL* which they meet in a common point *t*. (*b*) If a plane *V* is parallel to one plane of projection it is perpendicular to the other. It has no trace in the former, while its trace in the plane to which it is perpendicular, is parallel to *GL*.



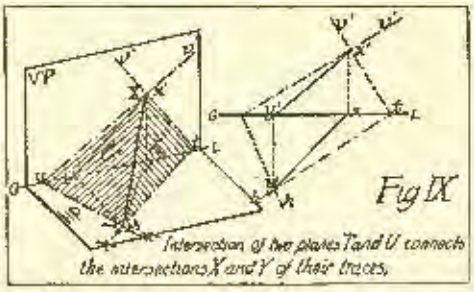
Plane U perpendicular to VP has horizontal trace perpendicular to GL

6. When a plane *V* is perpendicular to a plane of projection, its trace in the latter contains the projection of every point, line and figure lying in *V*.



Planes T and U being perpendicular to VP angle a measures true angle between them.

7. If a plane is perpendicular to one plane of projection and oblique to the other, the angle made with *GL* by its trace in either plane will measure its own inclination to the other. If it is perpendicular to both planes of projection, both its traces are perpendicular to *GL* and in the same straight line.

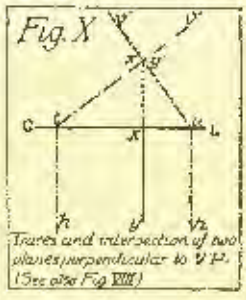


Intersection of the planes T and U connects the intersections X and Y of their traces.

7 *a*. If two planes *T* and *V* have their traces in one plane perpendicular to *GL*, they are themselves perpendicular to the other plane of projection, and the angle between their traces in the latter, measures the inclination of these planes to each other. Consequently when these traces cross at right angles, the planes *T* and *V* are perpendicular to each other (Figure VIII).

8. The intersection *xy* of two planes *T* and *U* in space is a line connecting the intersection *Y* of its horizontal traces with that *x* of its vertical traces. The vertical projection of *XY* is a line *x'y'* connecting the intersection *x'* of the vertical traces with the point *y'* on *GL* which is the vertical projection of the intersection *y* of the horizontal traces. Similarly *xy* is drawn from *y*, the intersection of the horizontal traces to *x* the horizontal projection of the intersection *x'* of the vertical traces (Figure IX).

8 *a*. When one of the two planes is perpendicular to a plane of projection, its trace on that plane itself contains one projection of *XY*, (see 6). When both are perpendicular to a plane of projection, the intersection of their traces on that plane is itself the corresponding projection of *XY*. On the other plane the projection of *XY* is a line parallel to the parallel traces of the two planes.



Traces and intersection of two planes perpendicular to VP. (See also Fig VIII)

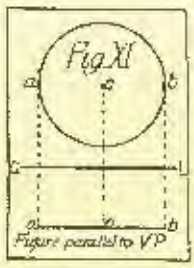


Figure parallel to VP

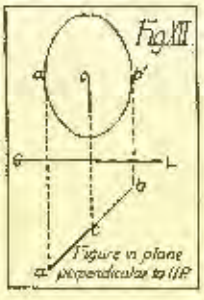


Figure in plane perpendicular to HP

9. If a plane figure is parallel to one plane of projection it is perpendicular to the other. Its projection on the former is a figure equal and parallel to itself; its other projection is a line parallel to *GL* and coincides with the trace of its own plane (see 6). If a plane figure is perpendicular to one plane of projection but oblique to the other, its projection on the former is a right line coinciding with the corresponding trace of its own plane (5), but its other projection is neither similar nor parallel to the figure. Thus a circle *AB* perpendicular to *HP* and oblique to *VP* has for its horizontal projection the right line *ab*, while its vertical projection is the ellipse *a'b'*.

[To be continued.]

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF DR. W. B. PARKER, MARLBOROUGH ST., BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

(Gelatine Print, issued only with the Imperial Edition.)

THE LURAY INN, LURAY, VA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

THIS illustration shows the building as recently enlarged.

INTERIOR OF ST. MARK'S, VENICE, AFTER AN ETCHING BY OTTO BACHER.

THE MISSION CHURCH, SANTA BARBARA, CAL. — AN OLD CALIFORNIA HOUSE. — COURT-YARD OF AN ADOBE HOUSE AT LOS ANGELES, CAL. SKETCHED BY MR. J. G. HOWARD, CHELMSFORD, MASS.

NO SUNDAY OPENING FOR THE METROPOLITAN MUSEUM OF FINE ART. — The interest that is felt in the proposition to open the Metropolitan Museum of Art to the public on Sundays is not confined to the progressive citizen of New York. People of this description in all parts of the country are equally interested in the matter, and one of them has recently taken a very emphatic course to show how thoroughly he believes the thing ought to be done. In recent conversation with one of the Trustees of the Museum upon the question, Mr. W. T. Walters of Baltimore, was given to understand that the principal reason why the Museum was not opened on Sundays was that it would cost $2,000 a year in addition to the present expenses of maintenance to do so. Mr. Walters upon his return home at once inclosed his check for $10,000 to the Board of Trustees, and wrote an accompanying letter, saying that the contribution was to be used in defraying the cost of keeping the Museum open on Sundays to the general public for five years. The matter was submitted to the consideration of the Board, and after consultation the check was returned, with the statement that the Board could not afford to accept the proposition. They were afraid of alienating strong support from the institution. — *New York Times.*

CHAPTERS FROM THE HISTORY OF CARPENTRY AND JOINERY.[1]

An Italian Town. From *Le Moniteur des Architectes.*

BETWEEN the decline of the Roman Empire and the tenth century there is a long and dark period, when little peaceful activity and much warlike strife went on in Europe, and this has left nothing for us to consider to-night. After this comes the period known as the Middle Ages, which may be roughly described as beginning a little before the First Crusade, and continuing to the Reformation. We have a great many remains of work done at that time in our own country, and the same is true of the time which followed it — the modern period.

England (and when it is practicable, London) will chiefly illustrate this history for us, though we must refer to Continental woodwork also.

There is not much builders' work of any sort except the most sturdy which has come down to us from the time of our Saxon kings, but there is — or was ten years ago — a small ancient timber church at Greenstead, in Essex, near Ongar, of which Sir Gilbert Scott gives a description in his lectures. He says that "the foundation of it can be traced back to A. D. 1013, which is more than fifty years anterior to the Norman Conquest. The structure is composed of cleft oak trees, grooved and tongued together by their edges, and let into grooves in horizontal heads and sills. The exterior of the trees was exposed on the outside of the church, the sapwood of which having long since perished, the furrowed and guarled heart is now seen, presenting a most ancient and interesting appearance. It has been repaired, but I trust that its antiquity has not been compromised."

The Norman Conquest placed this country at the disposal of a race of very energetic and clever invaders, who were builders, sailors and shipbuilders. In every part of England Norman churches and castles, and in the great towns Norman cathedrals and monasteries sprang up, and the floors and roofs of these buildings required the skill of the carpenter, and some of the roofs — such, for example, as that over the nave of Peterborough Cathedral — were of not inconsiderable span, and carried a flat wooden ceiling. As Gothic architecture gradually developed, the roofs, timber-spires and floors, and the internal woodwork of churches and other buildings improved; though it must be admitted that, with our present notions and habits, we should have considered the carpenters of those early times clumsy; and it is impossible to deny that some of the earlier roofs of which the framing still remains are unscientific. The most important works of the carpenter are timber roofs. I had the honor of giving a lecture on this subject in 1885, and as many of you may have heard that lecture, and all can consult it in the building journals, I shall make my reference to this branch of the subject brief, pointing out, however, that the early carpenters used very large timbers, placed very close together, and of oak or chestnut, so that their structures, if heavy, were very strong.

I had to point out in that lecture how the use of a tie-beam was early abandoned, and a collar substituted as roofs became more steep; how in various ways curved ties, ribs and struts were introduced; and how the what is called a wall-piece, which it was always customary to use, was made to project inwards, and was supported by braces and grew by steps which can be traced in a succession of English church-roofs, till it became that peculiarly English feature, the hammer-beam. The finest specimen of the hammer-beam roof is that over Westminster-Hall, dating from A. D. 1397. The peculiarities of English roof-carpentry, when at its best, are well illustrated in this roof. They may be pointed out as the use of the hammer-beam; the use of vertical and horizontal main timbers within the lines of the principal rafters, to the almost total exclusion of raking-struts or braces — keeping all horizontal ties high up; the introduction of curved ribs and struts so as in some way to give an arched form to the main lines of the truss, and the filling-in of all spaces in the framework with small bars. In several respects these peculiarities are not those to be met with in modern roofs, but it must not be forgotten that the material was hardwood, and the joints were excellently made and pinned, so that the timbers were far more rigid when framed together than ours.

No one can, I think, look at this noble roof without feeling that, as a work of fine art executed in carpentry, it is one of the most successful that have come down to us. The roof really is Westminster-Hall, and nowhere have we an example of carpentry so thoroughly architectural.

Among the causes of its success, we must reckon the excellence of the lines of the truss and the regular repetition of truss after truss. The repetition of any framework good enough to span that vast space would strike the eye, for regular repetition is one of the acknowledged sources of architectural effect, but this framework is not only obviously sturdy, but it is full of beauty. The great curved ribs, the bold hammer-beams, the finely-carved angels that terminate these hammer-beams — each of these is a striking feature, and its force is intensified by its being repeated again and again all down the long space. Then the appropriateness and beauty of the mouldings and the filling-in heighten the effect, of which the force is further intensified by the introduction of a series of arched braces which run from one truss to another, and connect the whole into one roof, and by the skill with which the openings are formed where the dormer lights occur. In smaller, and perhaps in simpler, roofs, all these sources of beauty may, to some extent, be found, but nowhere else are they so perfect; and the impression they produce on the spectator is, no doubt, heightened by the great span of the hall, and the almost colossal scale on which the work has been done.

Referring you to my previous lecture for details of this roof, and for an account of other hammer-beam roofs, especially the singularly beautiful one which spans the Middle Temple hall, I propose to ask you to consider, for a little, timber-built dwelling-houses, a subject of no small interest.

In France there still remained till the early part of this century, and may linger yet occasionally, half-timbered houses dating from the twelfth century. One of these is described and illustrated in Viollet-le-Duc's "*Dictionnaire*." It is a small three-storied house fronting the street, with side walls of masonry, which are corbelled out just below the level of the first floor. The front wall is formed of large heavy timbers, framed together, and with the comparatively narrow spaces that they leave filled-in with plastering.

The first floor overhangs the ground-floor, but the second floor is plumb over the first. The window-heads are partly segmental and partly semicircular, and cut out of the solid wood. The timbers are most elaborately mortised and tenoned together, the framing being more like that employed in joinery or shipbuilding than like carpenters' work.

From the thirteenth to the sixteenth century half-timbered work was freely employed in France in house-building, and the timbers are much more moderate in size, well-squared, very carefully put together, and where enriched the mouldings are truly worked. In these timber-framed structures we may, from the first, see well carried out the principle which was universally adhered to in Gothic carpentry in joinery; namely, that wherever the timbers met and were framed together, whether they were halved or were mortised and tenoned, they should be square. Consequently, all mouldings are stopped or made to run out to the face. There is thus as much wood as possible at the shoulders to the mortises and tenons, and the strength is kept for the places where it is most wanted.

It is almost invariably the case in these timber fronts that each story overhangs the one below it, and at the top there is either a gable with a finely-worked barge-board, or, less frequently, an eaves-gutter and a roof, usually broken by one or more dormers.

In the general treatment there was a tendency for the timbers to be lighter as time went on, otherwise the changes in mode of framing, etc., were not great, except that in later examples you will find more diagonal braces. The ornamental work, however, *e. g.*, the carving, the enriched barge-boards and the heads of doorways and windows, partook always of the character of the moulding and carving in general use at the time.

It is specially characteristic of French timber-built houses that the plates into which the overhanging joists are pinned are almost always beautifully moulded, and that the gables and the dormers (where those features occur) have curved timbers, so combined with their barge-boards as to give a distinctly arched appearance to that feature.

In England timber-built houses dating from before the fifteenth century are very scarce; we have some of that century, more of the sixteenth, and still more of the seventeenth; nor did the change in taste, which we call the Renaissance, very radically affect our timber houses.

Had it not been that they all perished in the Great Fire, we should have, no doubt, still many examples of timber buildings in London; as it is, I can only point you to one or two. The most accessible specimen is on the south side of Holborn, nearly opposite Gray's Inn Road, where the gabled fronts of several houses, modernized on the ground-floor, retain above the kind of construction which caused this ancient Company of Carpenters to hold at one time the

[1] A portion of a lecture delivered by Prof. T. Roger Smith at Carpenters' Hall on Wednesday, Feb. 3.

most important position of any of the London companies that had to do with building.

A timber-built house was what is now usually called half-timbered. It had a low plinth or foundation of masonry. The fabric of its walls consisted of vertical timbers framed into a plate resting on the foundation and into another above, and usually strengthened or stayed sideways from one to another. Usually the first set of timbers only reached to the top of the ground story. The joists of the first floor, which were really massive timbers, quite unlike our modern joists, overhung, and the framing of the upper part consequently could be carried on a plate supported upon the ends of the joists, and so could project beyond that of the ground story. Where this occurred at the corner of a street, a massive post, often much enriched with carving, was usual, and many of these posts remain in country towns, even though the houses have been modernized. The spaces between the timbers were filled with brickwork, or more often lathed and plastered. Occasionally they were filled with tiles, and sometimes with woodwork, or even the whole boarded over.

A great many good manor-houses were constructed in this manner in the North of England, where a series of fine old half-timbered houses remaining in Cheshire and Lancashire may serve as a basis for some general remarks. The dates of the most famous examples belong to the sixteenth century, or are near it. Thus, out of a list of thirty-eight, I find seven to belong to the fifteenth century, the earliest date being 1460, and nine to belong to the seventeenth century, the latest date being 1648, but the remaining twenty-two are sixteenth century. It is astonishing to note how small the differences are between the early and the late examples. Almost without exception these homely, but very striking, houses are of two low stories only. The upper story usually overhangs, but not in a very marked way. The gables are never of a sharp pitch. The roofs overhang considerably, and are finished by plain barge-boards usually without finials, pendants, or carving. The walls and gables are constructed of strong timbers, well-framed together and pinned at the joints; almost always stained a strong black, and with the spaces between them filled-in with plastering kept quite white, so that the contrast is striking. There seem to be two schemes of arrangement for the timbers, but both occur sometimes in the same building in different parts. In the simpler scheme the timbers are most of them uprights, fixed very little more than their own width apart, and with a few horizontal timbers hardly breaking the monotony. Good examples of this are Agecroft Hall, Cheshire, and parts of Bramhall Hall, Cheshire, and Worsley Old Hall, near Manchester. In the other scheme the timbers are about three times as far apart as in the last. Horizontal transoms are more frequent, and there is a strong tendency to form panels that are nearly square, though oblong upright panels are also common.

These panels are filled-in by smaller pieces, often so arranged as to form a diamond, arranged with its corners resting against the sides of the main square, and having the inner face worked into some sort of quatrefoil — which figure is constantly employed in many different forms. Sometimes the long panels are filled with diagonal braces — a whole row of these sloping all the same way — but it is interesting to notice that crossed diagonal braces, which are quite common in French examples, rarely occur in the panels, though in some instances a gable-end is covered with a kind of reticulation formed of crossed beams. In the Hall i' th' Wood, a late example near Bolton, attributed to the middle of the seventeenth century, nearly every form of enriched panel is used, including panels formed by the use of curved lines, obtained, probably, by selecting naturally curved pieces; and in this and some other examples the builders seem to have been bent upon covering every part of the surface with elaborate and startlingly brilliant patterns; but generally the richness is kept concentrated on such places as gables and bands of ornament, and considerable portions are kept simple in treatment. The extremely strong contrast between the black timber and the white filling-in makes all these buildings a little startling in appearance.

I have mentioned that in these north-country examples the overhanging of the upper story is not always met with and not made conspicuous. I ought to add that when it occurs it often is worked into a kind of shallow cove.

If you compare these examples with such as can be found nearer London — say at Penshurst or Tonbridge — some points of contrast present themselves. In the south-country houses the roofs are steeper, the barge-boards more ornamental and often have pendants, and the buildings are sometimes higher. The quatrefoiled and other patterns in panels rarely occur, and the timbers are not so massive, nor are they made so black. On the other hand, the upper story generally overhangs very decidedly, and so as to cast a bold shadow; and very often a bay-window is thrown out in the lower story, the front of which projects exactly as far as the upper timbers overhang, so that the face of the bay is carried on by the face of the upper part of the building in the story above.

One example of a timber-fronted building of the most ornamental class, containing also a fine hall, survives in London in Crosby Hall, Bishopsgate, and, though various alterations have been introduced into the interior, which is now a restaurant, I believe the front to the street, though it has necessarily been much repaired, gives a good example in the original form of what such places as this were at their best.

Following the plan I have before adopted, let us consider for a moment the carpenter engaged upon these timber-framed houses as an artist. Very few persons will deny that these buildings possess a great charm. They, of course, have the antique air which adds a touch of something like romance to the actual beauty of any work of architecture; but they have intrinsic claims on our admiration. One of these is that they display their structure. In all buildings where the construction can be traced at a glance the mere fact of seeing how the fabric holds together seems to rivet attention and to satisfy the instincts of the spectator. This structural work has, moreover, the quality of breaking up and, so, enriching the surface of the wall. This pleases the eye, and, what is more, it adds to the apparent size of the building, so that quite a modest house, not much more than a cottage, rises into importance. The bold shadows thrown by the overhanging story, where it occurs, and by the projecting roof, are sources of striking effect when the building is lighted up by sunshine, and if the panels have ornamental filling-in, or if any of the prominent timbers or the barge-boards have carving or are moulded, such a touch of refinement enriches the whole. Simplicity in the general forms united to a good deal of variety, and richness to a certain extent, concentrated upon well-chosen points, are characteristic of the greater part of our English half-timbered houses and halls, and such a combination is almost sure to succeed.

Examples of English half-timbered work are to be found in many of our oldest towns, and also in country places. They exist, for example, at Chester, Shrewsbury, Tewkesbury, Coventry, Bury St. Edmunds, Canterbury; Weobley, in Herefordshire; Sherborne, in Dorsetshire — all of them places of remote origin. The most interesting country examples are, of course, more widely scattered, but a good many can be found within reach of Penshurst and Tonbridge, including almost the whole of one little village — Chiddingstone.

There are timber houses in many parts of the continent of Europe, as well as France. In several parts of Germany and Switzerland timber houses, often of great size, and sometimes of great beauty, are common, and the same is the case in Sweden and Norway, but as these buildings differ altogether from our timber houses, and would require almost an evening to themselves, if justice is to be done to them, I shall not attempt to notice them to-night.

It can hardly have escaped at least some of you that these timber buildings in England have been described as resembling one another very greatly, and yet that the date of many of them is long past the time when a radical change of taste took place. That transformation, which we now call the Renaissance — or the revival of Classic art — began in Italy in the fifteenth century, spread to France, and made its first appearance in this country at or soon after the beginning, in 1500, of Henry VIII's reign; but after that there was a long period of transition known by the names of Tudor and Jacobean before the new style completely prevailed, and it is interesting to note that even long after the details of most stone buildings, especially in the great cities, had become quite Italianized, the old traditions influenced the builders of timber houses. In many country places they lingered on very late indeed, and in some sorts of woodwork they still exist; as, for example, in the ornaments and mouldings of some sorts of barges and of many country wagons, which resemble to this day those in use in Gothic buildings.

In other branches of the carpenter's art the change in taste was more rapidly visible. Such open-timber roofs as belong to the seventeenth and eighteenth centuries are entirely different in their details and ornaments from the Gothic ones, and as time went on ornamental carpentry became much more scarce than it had been, and carpentry after the sixteenth century is chiefly remarkable for the scientific skill of the carpenter.

Carpentry was, however, largely employed in providing the shell or form of domes, high-pitched roofs and turrets, which, covered with metal or tiles, formed conspicuous ornaments on the sky-line of Renaissance buildings, and in this way it contributed to the architectural effect of many striking buildings. For example, the external dome of St. Paul's Cathedral, in London, and the Invalides, in Paris, are timber-framed and covered with lead in one case, and copper in the other.

One more chapter — a brief and imperfect one — we will devote to joiners' work. Of very ancient joinery we have a few, but very few traces, of the sort which ancient carpentry has left. Of Gothic, or mediæval joinery very little remains from as far back as the thirteenth century; more remains from the fourteenth, and a vast amount from the fifteenth and the early part of the sixteenth. These examples are chiefly in the benches, stalls, screens and other fittings of cathedrals and churches.

Many noble examples of transitional joinery exist in the shape of the great staircases, the panelled walls, the screens, and occasionally the ceilings of the many fine mansions erected in Elizabeth's reign; and while, as we have just seen, carpenters' work lost much of its ornamental importance at the time when the Renaissance became fully established, that of the joiner continued to be prominent. Of this, the choir-stalls and organ-screen at St. Paul's Cathedral, and the fittings of Wren's churches generally, may stand as examples.

In the joinery both of England and France, executed at the time when Gothic architecture prevailed, we find, as is well pointed out by the great French writer, Viollet-le-Duc, two main principles: 1. Great economy of material. 2. As much strength as possible secured where the parts join. It is an almost invariable rule that all the framing is of moderate dimensions. The panels are always of

moderate width, so that they can be cut from one piece of wood, and no pieces of large scantling or great thickness are introduced. The material was mostly hard wood — nearly all oak. It was selected with care; a great deal of time was devoted to seasoning it, and it came to be looked upon as very precious, and if material could be spared, even at the expense of extra labor, the preference was given to the economy of material rather than economy of labor.

The other point, the care with which the joiner of the Middle Ages secured as much of the stuff as possible at the places where his joints come, can hardly have escaped the notice of any practical men in my audience who have examined a piece of old framing, and it affects the design quite as much as the construction.

Wherever two pieces are framed together, it is usual that both — or, if not both, at least one, and that one usually the one in which the mortise is cut — should be square. Consequently, in such a piece of work as a door, if there are mouldings or chamfers on the styles, they are stopped before the point where each rail is framed. In much Gothic panelling, therefore, the sides that enclose each panel are stop-chamfered or stop-moulded, the top of the panel (*i. e.*, the bottom edge of the rail) is moulded, but the bottom of the panel, *i. e.*, the top edge of the lower rail, is very often splayed; and the system which we are all familiar with, of mouldings mitred round a panel, was almost unknown in England till the sixteenth century; nor was it the practice to plant mouldings on as we now often do, or to make use of the projecting mouldings, called bolection mouldings. Thus, you perceive, the framework of every panel was quite different from the framework of a modern panel in appearance. The panel also sometimes differed: it was often enriched by carving on it an ornament in relief. This ornament was very often what is known as a linen-fold panel — a conventional sort of imitation of a piece of cloth nailed upon the panel, and extremely rich in effect in many cases.

Although curved forms were largely used in the stone architecture of Gothic buildings, the designers of joinery were very chary indeed of introducing them. Sometimes imitations of small arcades, cut out of not very thick stuff, and similar small decorative features, occur; but, generally speaking, all the main lines of the joinery are straight, so as not to cut across the grain of the wood. In rich and elaborate work there is hardly any limit to the degree of ornamental work introduced, and here, of course, circular work occurs at times. Perhaps no example within reach will give you so good an idea of what was accomplished when joinery was employed as the ornament of a very rich building, as the stalls in Henry VII's Chapel at Westminster Abbey — a work executed just at the time when Gothic architecture was about to give way to the new style, and as florid and ornate as possible.

The general appearance, however, of even highly ornamental Gothic joiners' work is decidedly dignified, if not severe. The squareness and regularity of the leading lines, the frequency of the panels and the smallness of the mouldings all contribute to produce this effect. Much modern joinery has been done from designs made by men who thoroughly understand the old, and, for our purpose, some of it is as good as the old. For a good specimen of what I call the severe quality of Gothic joinery, I think you may go to the new Law Courts, from Mr. Street's designs, where you will see in the wainscot fittings of the courts and other parts the style of the thirteenth century thoroughly well carried out. For an equally exact reproduction of the richest joiners' work of the fifteenth century, I would ask you to go to the Houses of Parliament, especially the House of Lords, where you will see elaboration carried to an extent for which only a national work of that sort affords the opportunity.

The joiner's work, like that of the carpenter, was affected by the change of taste at the Renaissance, and was, I think, earlier and more completely transformed than the mason's and carpenter's work. It is not an unusual thing to see in an Elizabethan manor-house, where the general forms retain a great deal of Gothic character, panelling in the hall and staircase of thorough Classic design, and possibly a screen in woodwork (such, for example, as the one at Audley End), where imitations of Italian pilasters, columns, arcades, and so forth, are executed in wood cleverly enough, and with excellent effect of their kind, but of a character entirely and totally different from that which a screen executed a century earlier, or even fifty years earlier, would have had. Something of this difference exists, indeed, between the roof of the Middle Temple hall and the wooden screen thrown across the lower end of the hall to cut off a corridor. The roof we might call Transitional, the screen almost complete Renaissance.

The best specimens of English joinery after the sixteenth century are most of them largely indebted to the art of the carver for their effectiveness. St. Paul's Cathedral shows this both in the choir-stalls and the woodwork of the library, and, though the carving there is a miracle of skill and richness, and certainly combines consistently with the fabric, I doubt if the stalls at St. Paul's are as fine pieces of joiners' work, or as good artistically, as any similar piece of good Gothic stall-work; and I am quite sure that the general run of Renaissance joiners' work is less constructive, less thoughtfully designed, and I believe, to most tastes, less pleasing and interesting than the Gothic.

Between the mediæval and the revived Classic, or, as it might be termed, the imported Italian, there is a great borderland, where work known as Elizabethan, Jacobean or Queen Anne occurs, both in joinery for domestic purposes and in furniture. More than one of the lectures of this course seems likely to touch a little upon this, and this is a reason, if the length to which this paper has already extended were not in itself a sufficient excuse, for not entering upon what has a great deal of interest for us at the present day in connection with the modern revival of Queen Anne work. Suffice it to say that in its combination of forms and ornaments drawn from various sources, this transitional work often forces us to admire it even when we feel that much of its charm rises from its being irregular. Nowhere is such a work more in place than in joinery, especially for domestic use; and a vast amount of picturesque effect is obtained at the present day by the use of joinery for dwelling-houses designed in close imitation of the old English and Anglo-Dutch work, to be even found scattered about in many parts of London that have not yet been modernized.

Under no circumstances would the time have allowed me to go much farther in considering ancient joinery, and, with your permission, we will now break off and turn to the very latest chapter in the history of works in wood — a chapter which is perfectly new — of special interest to us in this hall, and, I sincerely trust, of vital importance to the craft.

By the liberality of one of its members — Mr. Harben, a member of the County Council for London — the Carpenters' Company is enabled to offer a series of prizes especially for the encouragement of skill and design in joinery as art, and in carving. Our technical examination has been directed to science and practical knowledge in carpentry and joinery as construction, and remains so. This is a new departure. For this Company it is a privilege, and no small responsibility, to be called to administer this gift through a series of years. For you it is an opportunity.

The prizes offered this first year are a first series, and there is a prospect that they will be carried farther in the future if the designers and craftsmen of London and the country generally encourage the Company by assisting us to make this movement a success. I appeal to you and to every designer, carver, and high-class workman who may become aware of it to respond to the invitation which is addressed to you by throwing yourselves heartily into the competition, and during the months between the present day and June, preparing specimens of the best you can do.

The subjects proposed for prizes are, it is hoped, varied enough and suitable enough to give opportunities to many. The first is a hammer-beam in hard wood. In designing this, you will remember that it is to be in a horizontal position, to be seen from below at about ten feet from the eye, that the end of it is free and projects, and the remainder is part of the framing of the truss of an open roof. If competitors guide themselves by old examples, as I hope they will, remember that the hammer-beam was used from during the fifteenth, sixteenth, and part of the seventeenth centuries, and that the details and carving must correspond with models within those dates. Of course, it is open to competitors to imagine a quite modern hammer-beam roof, and originate a modern treatment; but this is a very much more difficult thing to do even tolerably well.

Whatever period is chosen, such mouldings as are introduced should be such as will be seen from below, and will be effective when looked up to, and at ten feet distance. Carving is, I think, only appropriate at the fore end of the beam; but here a fine opportunity is offered to the carver, and the competition will no doubt turn mainly on the skill with which this is designed and executed, and adapted to the situation and the height, and also to the material, not forgetting that it will be one of a series, and so must have an outline that will bear repetition. It will make the hammer-beam more complete if it is mortised for the brace and post, and that should tenon into it; and if any of its mouldings are to mitre with those on the brace, for those on the hammer-beam to be properly cut.

The pieces of barge-board and finial are, of course, intended to occupy the apex of at least a two-story building. There is very great scope for variety of design in this subject. The examples begin in the fourteenth century, and barge-boards have continued in use to the present day. Some are cut, some only moulded, some pierced, a few partly carved. The finial is always moulded, and gives a good opportunity for design and for skilful execution.

A bench-end is a comparatively familiar subject. What, of course, is meant is one of more or less ornamental character. It is difficult to point to many good old Gothic ones in London, but very many modern ones of excellent design and execution are scattered about our best churches, and in Wren's and Gibbs's churches specimens of Renaissance designs are to be met with. In dealing with this subject, it is to be hoped that the competitors will remember that it is the whole thing, not the bits of ornamental carving which they will introduce that will be considered. Good outline, good proportions, good mouldings, as well as good execution of skilful carving will, accordingly, each play a part.

A table-leg presents the peculiarity that it is looked down upon. It requires both to be strong and to look strong. The great risk in designing it is making it clumsy or commonplace. It is not a subject into which it is easy to introduce carving successfully, for as soon as the leg begins to look as if it has to carry the carving, it begins to lose the look of carrying the table. Good enrichments to mouldings are, however, free from this danger.

A frieze is preëminently a carver's subject, and demands a knowledge of the nature of surface ornament, and power as a designer and carver. The work must be very good, because it is to be opposite

the eye, but it must not be extraordinarily delicate, because it is to be executed in soft wood. In such a subject, if animals or figures are introduced, they add extremely to the effect if they are well done; but if the carver is not sufficiently skilled in this branch of his art he had better not introduce them.

A bracket is perhaps almost more than anything else an open subject. Usually it is so treated as to be carved work entirely, but it may quite as appropriately be exclusively moulded, or a combination of the two. Remember that, however managed, the idea of support must not be lost, or the bracket is a failure.

The prize for a chair of moderate value offers in some respects the best opportunity to a man of genius. All the other subjects are, more or less, of an ornamental nature, and offer considerable scope for elaboration. Here the subject is familiar. The limitation of cost shows that the article must be a useful one, and that its excellence must be in itself rather than in its ornaments. At the same time it is quite possible for a skilful man to improve upon the ordinary chair, and it is very probable that if he really does so, his design may have a success outside the walls of Carpenters' Hall.

There is one prize which is intended to be won by skill and readiness in designing and drawing. The competitors will be set a subject unknown to them till they enter the examination-room, and will have two hours in which to do their best with it. No limitation is set as to what drawing materials are to be used, and you will note that competitors are to bring their own. Probably the best for such work is tolerably soft pencil. Of course, I have no clue, and can offer none, as to what the subject will be; but it seems to me that it will be likely to be of the same general description as the specimens of work — that is to say, something requiring good joinery and admitting good carving; and, of course, its merits will be judged as a piece of artistic design and draughtsmanship. Last, but by no means least, there is a prize for beginners in the art of carving in wood.

In closing these remarks, and with them this lecture, I have only to express very earnestly the hope that there may be a very good competition for each of these Barbon prizes, and my conviction that to win any of them is likely to do good to the successful competitor by bringing him into notice. The judges will award no prize unless they are satisfied with the work, and will not be desirous, so far as I can foresee their intentions, to admit or pass anything that is bad or indifferent. In the constructional examinations a very high standard was set last year, and will be maintained this year; and there is no reason why the same thing should not be done in the adjudication of the art prizes, and every reason why it should be done. To take a prize here will, therefore, be creditable and honorable to the successful candidate, and on this account, quite irrespective of the money value of such prize, will, I venture to predict, be of advantage to him in his career in life.

BUILDING LAW.

THE UNIFORM BUILDING CONTRACT.

MR. O. P. HATFIELD in a letter published in the *American Architect* for March 2, suggests that if the architect is made the owner's agent (as proposed by the "Standard Contract") there would be no "suspicion" of the personal responsibility of the former for work ordered by him.

We think that Mr. Hatfield, as well as the framers of the "Standard Contract," misconceive the true relation of the architect to his client, and overlook the wide departure from business principles and professional practice involved in an attempt to give the architect a power of attorney to order what he pleases. In special cases the owner would doubtless be willing to enter into such a contract; but ordinarily the idea would be rejected as soon as understood. We are aware of no relation in life where such a power is commonly given by a principal to the person he employs. Even an attorney-at-law has no authority to compromise his client's case.

But we think that there is no ground for the suggestion that if the architect were the owner's agent he would himself escape the danger of litigation. On the contrary, as more fully set forth in the *American Architect* for February 23, 1889, there is, in our opinion, little room to doubt that the proposed "agency" of the architect would create more trouble than it would cure. Our correspondent invokes the authority of Professor Parsons in support of the architect's unlimited agency; and quotes a provision from a form said to be contained in his "*Laws of Business*" making the architect the agent of the owner for the purpose of *superintending* the work. Such an agency would give no right to order *extras*, and the power to order extras given by section three of the "standard form" is what we object to most. Moreover, the book referred to contains no such contract or any form of building contract whatever. Perhaps Mr. Hatfield's friend had some English book in mind; English architects very generally insert some such clause in their contracts, though the practice has been severely condemned. See the introductory chapter of Sir Edmund Beckett's "*Book on Building.*"

We agree with Mr. Hatfield that a proper uniform contract blank would be extremely useful.

THE LUMBER DEALERS' DEMAND FOR A NEW LIEN LAW.

THE joint judiciary committee of the Massachusetts Legislature has given the lumber dealers "leave to withdraw." This ends the matter for this year at least.

THE FINAL PAYMENT CLAUSE IN NEW YORK CONTRACTS.

SAYVILLE, N. Y., February 18, 1889.

Question. — *Several years ago I had occasion to consult a lawyer in relation to the lien law in this State [New York].*

I was advised that it was not necessary to defer the final payment until the time had expired in which liens could be filed. The lawyer said that it would be perfectly safe to write contracts for building in such a manner that the last payment would be due ten days after the work on the contract was finished. He claimed that it was the right of material-men and others who might be entitled to liens to know the terms of a contract (as to payments) under which they were furnishing material or labor and that in order to hold the owner responsible they must record liens before the time when payment is due. The substance of his advice was to the effect that so long as the owner made payments when the contract said that they were due and not before he was relieved from all responsibility for liens unless said liens were recorded before the time when the payment became due. From what you say about liens in your law department I infer that the above advice is not reliable, and I would like to know positively whether it is or not. In case the advice is sound of course it is not necessary to keep the contractor waiting three months for his last payment which is sometimes quite a hardship. As I understand it, your legal department has been established for the discussion of questions of this nature, and I believe such a department will be of great service to the profession, as it is sometimes difficult and expensive to get reliable information relating to building law. If you can give me the law on this lien question without too much trouble I think it would be useful to many architects, builders, etc., as well as to

Yours truly, I. H. Green, Jr.

Answer. — In reply to the above inquiry it may be said with emphasis that it is *not* safe to pay all the contract money out before the last day for filing liens has elapsed. Wherever the mechanics' lien attaches irrespective of the state of accounts between the owner and contractor, the danger of paying out all the money while it is still possible that liens may be filed is of course obvious; where, however, as in New York, the owner is protected as to payments made before the filing of the lien, there is some ground for the opinion referred to by our correspondent to the effect that the last payment may safely be made before the three months have expired. But the New York law contains another provision which practically goes far to destroy this protection extended to the owner. Section two provides that if the owner "for the purpose of avoiding the provisions of this Act or in advance of the terms of any contract" pays the contractor, he shall be liable to the material-men to the extent of the monies thus paid. That is if the plaintiff in a lien suit can satisfy the jury that the money was not due from the defendant to the contractor at the time it was paid, and was paid collusively, the owner will have to pay the money over again. The owner has not only to face the well-understood danger that the jury will find for the less wealthy party to the action, irrespective of the weight of the evidence, but also labors under the very serious disadvantage of having practically to prove that the contractor was legally entitled to the money at or before the time when it was paid. Now everybody knows that partial payments on a building contract are made in ninety-nine cases in a hundred before they are strictly due according to the terms of the contract. Some little thing has not been done, for the omission of which the owner may, if he choose, refuse to pay the contractor; but in most cases where the work is progressing satisfactorily he is perfectly willing to make the payment. Now in a lien case under the New York law the owner must be able to satisfy a jury that the money was strictly and legally due when paid.

It is to guard against the danger of not being able to prove that none of the contract money was paid before it was due, that it is expedient to hold a portion of it back till all risk of such litigation is over, that is, until three months have elapsed since the completion of the contract. As already pointed out in this Department the real and practical object of protective clauses in a building contract is not so much to vary the law in favor of the owner as to guard him against the adverse verdict of a jury based on sympathy or a mistaken view of the evidence.

COMMUNICATIONS.

MOTTOS.

NEW YORK, N. Y., March 7, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Would you kindly mention a few pithy and suggestive mottos or maxims, English preferred, suitable for dining-room, hall and library? Have any such ever appeared in previous issues of your paper?

Yours respectfully, EMIL GINSBURGER.

[As English phrases such as "Let good digestion wait on appetite" are

hackneyed in the last degree we give below some which have not been so hard-ridden.

"*Les fous font des festins, et les sages les mangent.*"
"*Appetitus rationi pareat.*"
"*Magister artis ingenique largitor, Venter.*" —Persius.
"*Ventre affamé n'a point d'oreilles.*"
"*Sine Cerere et Baccho friget Venus.*"
"*Sero sedentibus ova.*"
"Beware of a man of one book."
"A book is a book although there is nothing in it." —*Byron.*
"In the four quarters of the globe, who reads an American book?" —*Sydney Smith.*
"Books cannot always please, however good." —*Crabbe.*
"Welcome ever smiles, and farewell goes out sighing" —*Shakespeare.*—Eds. American Architect.]

NOTES & CLIPPINGS

Present Navigation in the Panama Canal.—The fact that a British vessel of 270 tons has passed through the Panama Canal from Aspinwall to Chagres, a distance of fifteen miles, shows that the canal is something more than a scratch on the earth's surface. It is more reasonable to suppose that such an enterprise will be completed than it is to believe that it will be abandoned.—*Atlanta, Ga., Citizen.*

A Narrow House in New York.—It is possible to swing a cat, if any one ever did want to apply that time-honored, but rather useless system of measurement, in the four-story brick house at the northwest corner of Lexington Avenue and Eighty-second Street. But to do it without damage to the cat and the furniture, puss must be swung from north to south, not from east to west, for though the house stands upon a lot 102 feet deep, the land is only five feet wide, the actual width of the building being four feet. The sills and lintels are of white marble, and three bay-windows run up from the first floor to the roof. It is probably the narrowest brick dwelling-house in the city, if not in the country. Small, round windows, like port-holes, let light into the basement, and the doors are mere slits in the brick walls. It was built in 1882 by its owner, Mr. Richardson, who lives in it. He is a brother of Captain "Ben" Richardson, the eccentric millionaire, who died in Harlem the other day, and is a wealthy builder and contractor. He owned the lot, and being unable to sell it at a good price on account of its narrowness, he determined that it should not be sacrificed. So he built a house on it for himself, and, though the rooms on the inside are barely more than three feet wide, the family say they do not feel uncomfortable in their cramped quarters.—*New York Tribune.*

Factory Chimney Construction.—A tall chimney is seldom a very pleasing architectural feature, yet it is an important part of factory construction, requiring special architectural skill, a point not often acknowledged by either architects or owners. A manufacturer contracts with a boiler-maker for a certain amount of power from a given quantity of coal, and if he fails to perform his contract there is trouble, when the chimney may be the whole cause of the failure. If a chimney is required to take away gases or fumes from retorts and furnaces, then it must be built to a height sufficient to carry these clear off the surrounding premises. This height can only be determined by a knowledge of the nature of the gases, etc., and the situation of the factory. In the following remarks it is only intended to deal with a chimney necessary for ordinary factory purposes. In order to give the required draught to the common steam-boiler, the chimney should be not less in height than 80 feet above ground surface at its base, and not exceed 120 feet unless there is higher land in the immediate neighborhood. To find the necessary area of a chimney, first ascertain as nearly as possible the area of the grate-bar surface of the various furnaces; then if the chimney is to be 80 feet in height above the ground surface, multiply the area of the grate surface in square feet by 14; for a chimney 100 feet high, multiply by 11; for a chimney 120 feet high, multiply by 12; and for a chimney 160 feet high, multiply by 8.8, and the quotient in each case will be the area of the chimney in square inches at its narrowest point. The area at the top of a chimney should never be less than at the base; some engineers say that it should be greater, because the smoke and air entering the chimney at a very high temperature ascends rapidly, but as it cools in its passage through the flue its progress gradually becomes slower. A square chimney was erected only last year, in Hamilton, for the Canadian Screw Company. It is 100 feet from floor of boiler-house to top of cope. The flue has an equal area at top and bottom of 2,116 square inches. It was designed to give draught to three boilers of 100 horse-power each, two drying ovens and four annealing furnaces. To it also was connected an eight-inch pipe from the drains. It is now working and giving perfect satisfaction. The foundations ought to be deep enough to take all the footings below the reach of frost, each course projecting beyond the one above not more than two-thirds of its own depth—thus increasing until a projection of foundation is gained beyond the line of the base of the chimney, equal to one-twenty-fifth of the height of the chimney above the ground surface. This is necessary for the stability of the chimney upon a good hard bottom. On soft land or bad bottom, the area of the foundation must be increased so as to spread the weight over a surface sufficient for its support. The strongest chimney is one built entirely with brick above a stone foundation, and the best form of plan is the octagon, the draught of which is almost as good as the circular, and the cost of the building is considerably less. In setting out the brick-work, start at the top and figure downwards. If the width of the flue is less than five feet, then the walls of the chimney will only require to be one brick for twenty-five feet below the cope, and if the outside of the chimney has a batter of one-fourth inch in every foot, the thickness of the walls at the base will be what they measure. The inside face of brickwork above foundation ought to be of fire-brick, carried about one sixth the height of the chimney, and air space is not necessary, unless where a strong flame (as from wood fuel) would be constantly striking. Finally, have as few openings as possible into the chimney, and upon no consideration allow waste or exhaust steam to enter it.—*The Architect.*

TRADE SURVEYS

The generally prosperous condition of the country is manifested in various ways. The volume of imports and exports for the first two months exceed all previous records and the same is true of imports and exports for seven months past. The distribution of merchandise is also in excess of former years according to trunk-line statistics and clearing-house returns. At the same time there is a marked downward tendency in prices as shown in iron, coal, lumber, oil, etc. By many this tendency is regarded in an unfavorable light but coming as it does before the opening of the active year's business, it helps to lay a solid foundation for future trading. Those who closely follow the ups and downs of trade are familiar with the depressing or exciting influences that fluctuations in values have, and often too, when there is no legitimate cause for a modification of opinions. Just now the general markets of the country are liable to price fluctuations when the condition of stocks and the condition of demand do not at all warrant such fluctuations. The secret of the whole matter is this, that there is a certain or rather an uncertain surplus producing capacity, machinery, labor, money, plant, etc., and the question is, will all or any, and if so, how much of this surplus capacity be employed. If all, then prices will advance, if none, then prices will decline, if a little, then there will be a fluctuation this way and that as the country exceeds in its consumptive demands, the limits reached last year. The third month of the year like the first and second, have brought more railroad, mining, financial and business activity than last year if accustomed authorities are to be believed. In New York plans were filed during February for 298 buildings, to cost $5,477,475.00 or 98 over February, 1885, when the estimated cost was $3,271,980.00. During four days this week permits were taken out in Philadelphia for over 600 dwellings according to the permit file in the inspector's office. At Pittsburgh over one million dollars' worth of new work has been placed in the hands of architects within a month to say nothing of two bridges to cost $900,000, one below the city to cross the Ohio River at Brunots Island, and another across the Allegheny River at the point where tradition says Washington crossed on a raft when executing his first commission for Governor Dinwiddee of Virginia. Architects in Chicago have not entered upon the heavy work of the season but are confident of abundant work. An unusual amount of hotel building is on the boards. Theatres, halls and public buildings will engage more than average attention and capital this year. The same is true of brick buildings. Within thirty days, a record of thirty new bank buildings has been made, costing from $300,000 down. The record of projected educational institutions, churches, asylums and the like is quite large. Another very important feature is the amount of railroad terminal work. All of the Eastern and Western trunk lines have schemes and programmes to carry out involving unusual outlays. At Philadelphia large sums have been invested in river-fronts. Also water-fronts have been purchased at Staten Island. Freight-handling facilities are to be improved all along the Atlantic Coast; whatever else the railroad companies have to complain of they cannot fairly grumble at declining traffic. Prices in nearly all directions are lower than last fall, and the general feeling in trade circles that they have touched rock-bottom is helping confidence. The textile goods manufactures are producing, all through, about 25 per cent more than January 1. The iron and steel makers are producing less, the steel-rail makers less than ever and prices refuse to harden, notwithstanding the rather general refusal of makers to accept business at prices railroad builders are offering. Makers of machine-shop products have been quite busy all winter and railroads have been pretty well supplied with the resulting traffic westward to storage and distributing points throughout the Mississippi Valley. Agricultural implements are likely to be very generally wanted this season, at least manufacturers have for months been acting on this belief. Wood-working-machinery makers have not been overcrowded at all but fairly busy excepting some of the younger aspirants for trade. Builders of light locomotives for mine and lumber use have been quite busy, and all but about three locomotive-building concerns have had a full average labor force at work all winter.

There is a certain percentage of traders and manufacturers who are feeling the nipping effects of increasing competition, and, in their efforts to tide over temporary difficulties, a good deal of second-class "paper" has been made, which far-seeing and prudent bankers do not care to encourage. While there is a surplus above the legal limit in New York banks of from six to seven million dollars, there is a pronounced stringency among these traders, who are crowded towards the outer edge of the world's race-track. Times are not getting harder, but there are more business men in need of kind consideration from banks than three or six months ago, and it is not an easy matter to clearly explain why it is the case. Very few in trade or production are realizing as much margin. The strong point everywhere is that there is scarcely any accumulation of stocks. The copper trust is a magnificent exception, and the copper buyers on both sides of the water have their mouths set for a cheer if, and when, it terminates its existence. There is a greater necessity for caution in mercantile dealings now than heretofore for one or two reasons. Every producer is anxious to utilize his capacity or capital, or whatever he has to sell, and but little pressure is necessary to carry the present conservative management across the line into over-production. The possibility must always be kept in mind, in attempting to form opinions of trade probabilities, that a general and price-stimulating expansion of demand is always present, much as the statement may be doubted. Any posted financier or promoter will say to-day that if the projected work now before the country were entered upon, a boom in demand and prices would of necessity follow. But of this there is little present possibility. Railroad building will exceed the proportions anticipated by even well-informed editors of railway journals, as those know who keep a list of projected roads. There is no decline of manufacturing activity in the Southern States. Gold and silver mining enterprise is pushed. Last year, gold and silver production, according to mint figures, was $92,870,000. Large mining-machinery orders are drifting into foundries and mills where facilities are such as to do heavy work. The impulse that has been given to the mining of the precious metals by the profitable workings of new and old mines will not disappear, for railroad building in the far West is leading to a closer inspection of mineral territory, and the opening up of remarkably rich mines.

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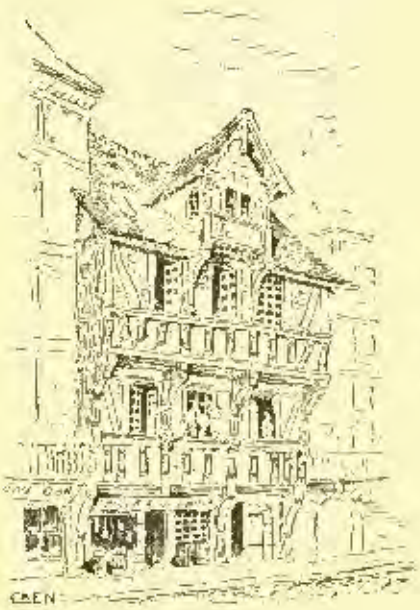

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HALF-TIMBERED HOUSES.

The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Tichnor & Company, Boston, Mass. No. 691.

March 23, 1889.

Entered at the Post-Office at Boston as second-class matter.

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PROFESSOR EATON, of New Haven, has done the public a service in calling its attention to the advantages of having buildings, particularly public buildings, including monuments, designed with some regard to the artistic impression they will make on the beholder. It is of little use for architects to make representations of that kind, as they are always supposed to do so from selfish motives; but the opinion of a layman of position is sure to be received with interest and attention. Professor Eaton describes the careful preparations which have been made for securing the best work that German artists are capable of in the memorial which is to be erected to the late Emperor William. As most of our readers know, a preliminary competition has been arranged, in which the choice of site, out of a number of available ones in Berlin, which are specified, is left to the competitor, as well as the method of treatment, whether architectural or sculptural, or both, and nearly all other matters except the scale on which the drawings or models shall be made. This preliminary competition is to decide which of the artists engaged seems to comprehend best the character and services of the late Emperor, and when that has been decided, a second competition is to settle what design shall be executed. The jury which will decide in both competitions is to be composed of experts, and the result is sure to be in the highest degree interesting and successful. Professor Eaton remarks that as the contest is to be confined to German artists, the French sculptors will lose the opportunity that they might otherwise have had, to gain an artistic triumph over the great rival nation. We are by no means so sure that the French sculptors would have an easy victory over their antagonists across the Rhine. In combining sculpture and architecture the French are as yet unapproached, probably for the reason that with them a sculptor and an architect always work together, but for power of expressing sentiment by sculpture there is little to choose between the French and the Germans, when both are at their best. Nor, strange as it may seem, would there be much to choose between either and the best Americans, if the latter had a chance to show what they could do. We say advisedly, that if Americans could be properly taught, encouraged by intelligent criticism, in place of the drivel that most newspapers pour out over what they call "art," and kept employed on work that would rouse their interest and enthusiasm, they would equal, if they did not surpass, any civilized nation in the variety and elevation of their sentiment, the vividness of their impressions, and their power of expressing them. There is plenty of evidence that we possess already in this country heaven-born geniuses, capable of opening our eyes almost to a new life, if we would only give them an opportunity, but we never seem to find them, and we are never likely to find them until it occurs to some one that there may be a question about the correctness of the ordinary theory, that any one who can read and write is capable of judging of works of art, and that the more thick-skinned and loud-voiced a man is, the more likely he is to be a great sculptor. When some American shall take it into his head to have the inside or outside of his house adorned, as it would be in the Berlin residence of a German noble, with beautiful and touching sculpture, the beginning will have been made of a new step in American civilization. He would probably not get what he wanted, for there are only half-a-dozen persons at present in this country who could furnish it; but if he successfully resisted the temptations that would be presented to him, to "let the job out by contract," or to have the work done in papier-maché, or in stamped zinc, or reproduced by casting from some foreign example, and had the discretion to avoid the old stagers from Rome, and the belauded favorites of the society newspapers, who would seek his favor, he would at least put it into the head of some people who loved that sort of work to try to learn to do it well, in the hope of employment, and of other citizens to desire similar but better work in their own houses, and to look for persons to do it for them. By that simple process a demand for "art" would have been created which horrid-looking acanthus-leaves seven feet long could not supply, and sooner or later some one would be found who could do what was wanted, and thus furnish a point of departure for the next step. In fact, the first step has already been attempted. General Meigs, in the Pension Office at Washington, has introduced a terra-cotta frieze, or rather band, of historical subjects, which is not only interesting, but contains some beautiful work; several good pieces of interior sculpture are to be found in New York, and Governor Ames, of Massachusetts, has a well-meant band of sculpture around his house in Boston, which, by the way, was put there at his own suggestion. The next thing is for others to do the same, on a smaller scale, if they wish. The size of the sculpture has nothing to do with its value, and the possessor of a panel a foot square may find himself famous on account of it, if he will take pains to have it good, and to put it where it can be seen. If the present generation did nothing but build rock-faced walls, with one small panel of such sculpture to each house, it would have prepared a sure foundation for the most brilliant architecture that the world has ever seen, and there is no way in which the preparation for such an architecture can be so well made.

PROF. IRA O. BAKER, of the University of Illinois, writes to the *Clay-Worker* a letter on the crushing-strength of brickwork, which is interesting, but needs, perhaps, a little comment. It seems that at the recent Convention of Brick-makers, one of the members expressed himself as being "provoked" at the "absurd ideas" commonly entertained in regard to the resistance of brickwork to crushing. During the discussion which followed this declaration, another member said that "a brick wall, laid in excellent mortar, two feet thick, and of ordinary brick, will stand its weight two hundred feet high," while a third referred to chimneys that had been built two or three hundred feet high. As those chimneys were, of course, built thick at the bottom and thin at the top, their height affords no indication whatever of the crushing strain upon the base; and the second speaker's impression, that a good brick wall would stand the pressure due to its own weight if built two hundred feet high, is far within the limit accepted by those "absurd" persons, the architects and engineers, who commonly allow a pressure of fifteen tons per square foot on good brickwork, equivalent to the weight of a column of the same brickwork of uniform dimensions in plan, and about two hundred and sixty-eight feet high. Professor Baker, however, throws the usual data completely aside, and says that in some experiments made by himself brick piers in lime-mortar have resisted a pressure of one hundred and eight tons per square foot, while piers in Portland cement have stood one hundred and eighty tons per square foot. He asks whether "any one ever heard of brick masonry being crushed by any load brought upon it in an actual structure," and evidently thinks that the ordinary limit for crushing-strength of brickwork is set far too low. In regard to his question, whether any one ever heard of the actual failure of brickwork by crushing under the load brought upon it in a building, we can say at once that we have.

Some years ago a building fell in Denver, Colorado, under circumstances which showed plainly that the failure was due to the crushing of the brickwork under the ends of a large wooden truss which supported the front above the first story. It is true that the bricks, a sample of which was sent to us, were poor, but the load on the wall, which we computed at the time, was far less than that which Professor Baker's piers sustained safely. How many other cases of the kind there may have been we cannot say, but our impression is that they have been tolerably numerous. The former Superintendent of Buildings in New York, Mr. Esterbrook, would not pass plans which showed that the possible load on any pier or wall of brick exceeded fourteen tons per square foot, and as this limit is different from that given in any book with which we are acquainted, we suppose that it must have been founded on experience with the New York bricks, which are ordinarily of excellent quality. In most places, we think, the limit is fifteen tons per square foot, which is about equivalent to Professor Baker's result for crushing, with a factor-of-safety of seven; and as a factor-of-safety of six is commonly used for members subjected to a crushing strain in buildings, and is specified by law as the minimum in some places, we doubt whether, even on Professor Baker's results, the usual limit can under ordinary circumstances be with prudence exceeded.

THE investigation in regard to the Assembly Chamber ceiling at Albany has been pressed with more zeal than at one time seemed likely to be expended upon it, and, although nothing will probably be discovered, the principal actors in the affair have been made temporarily nervous, and have scattered to parts unknown, taking their books with them. The immediate cause of this ignominious flight appears to have been the failure of the attempt to get experts to testify that there was no ground for the report of the first commission. One architect did, it is true, testify that he did not think there was an unreasonable profit in the contract, but he did not say what he considered an unreasonable profit; and, as another expert said that the profit was one hundred and thirty-five thousand, two hundred and seventy-four dollars and a half, or just one hundred per cent, the contractor probably thought that there might be persons who would consider that too much, and that he had better withdraw himself from the public eye until the unfortunate affair had blown over. Another reason for his sudden fit of modesty is, perhaps, to be found in the fact that when his examination before the committee had shown him that he could neither frighten the committee, nor satisfy their curiosity, by calm insolence, and that they were likely to take what the New York *Tribune* calls the "most extraordinary step" of compelling him to show his books, he, or some one else for him, made the mistake of having the books tampered with, by alterations and interpolations, so as to conceal what he had really done with the money. He forgot that there are a hundred men who can detect a falsification in an account-book for one who can detect a defect or a fraud in a piece of construction, and the immediate exposure of the alterations rendered him liable to questions which he preferred to avoid answering. He seems, however, to have found a worthy successor as a witness in the person of the sub-contractor, Mr. Sullivan, who, when his time-keeper testified that the main beams in the ceiling, instead of being of iron, as required by the specifications and contract, were of wood, "explained" that "they were lateral beams," and "had to be of wood, as iron could not have been successfully used." It would puzzle an architect to say why iron could not have been used for the lateral beams as well as any other part of the structure, but we must remember that the persons principally concerned in the matter, instead of regarding it from the architect's standpoint, seem to have looked only to the most efficient method of doing the worst possible job for the largest amount of money; and from this point-of-view the employment of iron would be less successful than that of wood in places where the latter could be made to hang together.

THE cause of the disaster at Hartford, by which a hotel was blown up in the middle of the night, and many persons killed, is now definitely known to have been the fastening down of the safety-valve of the boiler by one of the two engineers, probably with the knowledge of the other; and both engineers have been held for trial on a charge of manslaughter. Although the building was proved to have been weak and badly built, the verdict states that there is no evidence that this contributed to the result, for the explosion must have been violent enough to destroy any building, however strong, in which it occurred. It seems from the evidence that some complaint had been made of the lack of steam in the morning, and the engineers found that a simple way of overcoming the difficulty was to keep up a good fire during the night. Sometimes the fire was too good, and the steam-pressure ran up so high that the safety-valve blew open. This startled the inmates of the house, who made complaint, and the ingenious engineers then provided for the new difficulty by fastening down the safety-valve so that it could not blow open under any circumstances. How effectual their precaution was the result showed. It would be interesting to know how many more steam-boilers in our large cities have their safety-valves tied down, for fear they may blow open and frighten their owners. Probably the number is by no means inconsiderable.

MR. CHARLES S. FROST, the architect of the Owings Building, in Chicago, in which some of the floor-arches fell a few weeks ago, writes us to say that the account of the matter in the daily papers, on which our comments were based, was entirely erroneous, and that the total damage due to the accident, which seems to have been caused by the injudicious handling of a heavy water-tank in the upper story, did not exceed four hundred dollars. Mr. Frost adds to this explanation an observation, the justice of which we meekly acknowledge, to the effect that it would have been becoming in us to have made "at least some effort to get at the truth of the matter, before publishing such statements." We think we can honestly say that we do not lightly give circulation to reports in regard to buildings which may affect the reputation of their architects or builders, and we are sorry that the exaggerated reports of the accident in the daily papers should have been plausible enough to mislead us, but while making this apology to Mr. Frost, we hope he will consider that it is rarely possible for us to send experts to investigate occurrences of the sort, so that we must rely on the ordinary accounts, unless some of the people on the ground, who can see and comprehend the facts, will do us the great service of writing to us their version of them. If several accounts, from different persons, should be sent of the same thing, it would be so much the better, and if we could receive them early, we should often be put in a position to render effective service to the architect or builder, in counteracting the erroneous impressions given by the ignorant and sensational reports in the daily press.

WE heard an Englishman once inquire how much rent was asked for a certain house in New York. The house was a tolerably modest one, on a side street. He was told that the rent then paid was eight thousand dollars a year. He apologized for not having made himself understood, and explained that he had not asked the price of the house, but only wanted to know the annual rent. On being told that this was what the tenant paid every year, he was overwhelmed with amazement, and expressed the opinion that Buckingham Palace was the only house in London which would command anything like such a rent, and he doubted whether even that would fetch so much. To Americans it is a standing wonder how English houses can be rented so cheaply, considering the fact that building costs nearly or quite as much in England as here, and that houses being built on ground-leases for the most part, the interest on the value of the land, as well as a sinking-fund for reimbursing the value of the building during the term of the ground-lease, must be paid by the tenant. The *British Architect* gives a description of some new houses now offered for rent near London which is calculated to make a New Yorker envious. The houses in question stand in Bush Hill Park, a large estate which has recently been improved by building a number of picturesque houses surrounded by gardens, in which the old trees on the estate have been preserved. One of these houses, containing on the ground-floor a recessed porch with a tiled floor, a drawing-room sixteen feet long by thirteen and one-half feet wide, a dining-room fourteen feet long by the same width as the drawing-room, a square hall, with two roomy closets, a staircase having an oriel window on the landing, a kitchen, scullery and coal-house, with four chambers, bath and water-closet above, a roomy garden in front, and three thousand feet of land in the rear, rents for one hundred and fifty dollars a year. Others, with larger rooms and more chambers, and about twice as much land, are rented for two hundred and fifty dollars, and some of intermediate quality for two hundred dollars a year.

EARTHQUAKES.[1] — II.

THERE remains to be explained many of the peculiarities of earthquakes accompanied by aërial tempests, water-spouts, hurricanes and whirlwinds. These earthquakes are the most frequent, and it is perhaps the observation of these which suggested the theory endorsed by Aristotle in regard to these phenomena. From the farthest antiquity, moreover, atmospheric perturbation accompanying great terrestrial shocks have been remarked. It is narrated in the song of Deborah and Barak in the passage where it speaks of the people of Israel in the neighborhood of Sinai, "*Domine, cum exires de Sahir et transires per regiones Edom, terra mota est, caligine ac nubes distillaverunt aquis.*" In several psalms we also find analogous descriptions which, although written by inspired men and prophets, agree perfectly with observations which have been made later by physicists and naturalists. Consequently it cannot be denied that the great convulsions of the earth are very commonly connected with violent rainstorms. How, then, reconcile the theory of terrestrial vibrations with the meteorological perturbations which so often accompany the earthquake? Father Galli succeeds in doing this by means of a very ingenious comparison. He recalls the discovery of Chladni, so admirably explained by Faraday, and fully confirmed by the experiments of Savart, to wit, that the powder of the lacopods is concentrated in little round balls upon the protrubrances rather than along the nodal lines, because it is raised up with a circular motion, and transported by little whirlwinds which are formed where the vibrations are strongest. It is only needful to apply this theory on a much greater scale, to understand that the mighty vibrations of the ground can give birth to the local cyclones which ordinarily accompany earthquakes.

Certain other phenomena have been noted, which seemed to appeal against the vibratory theory, but which the author has succeeded in interpreting practically in a sense favorable to his theory. For example, after some earthquakes there have been found statues and even pyramids moved from their bases, and sometimes even overthrown. Now listen to the experiment to which Father Galli had recourse to explain these facts: He took one bracket of marble and one of slate, of dimensions absolutely equal, and built them solidly into the wall without any other support. He then built on each of these two brackets a pile of prisms of hardwood, of the same height and with rectangular bases. He then made the front of each of these brackets vibrate by rubbing with a stick upon his finger resting against this same side. The effect in both cases was the same. If the front face of the pile was perpendicular to the axis of vibration, the prisms were displaced from the front backwards, preserving a parallel alignment; but if the anterior face of the pile was oblique to the axis of vibration, the prisms all turned to the same side with an angular displacement increasing from base to summit, and bending to right or to left, according to the character of their obliquity. It seemed to result from this with perfect certainty that the earthquake is nothing more than an essentially vibratory movement of the crust of the globe, and that the waves of earth are veritable waves of vibration similar to those which a shock produces on the surface of non-oleaginous liquids. Consequently the rocky mass does not move, does not oscillate, and the displacement of some bodies, the slipping of some superficial layer, the turning movement of stone prisms, the oscillations of walls and trees, are only various effects of vibratory movement, which alone or in combination with the action of gravity, are transformed into reflex movements determined by all of the conditions of equilibrium of bodies and the laws controlling the communication of the movement. The surface of the soil vibrates as does the surface of water in longitudinal and transverse vibrations; and when this vibratory movement is propagated in a horizontal direction the transverse vibrations are the most extensive, and become vertical, that is to say, are effected in the plane of the least resistance. The superficies enveloping these elementary waves becomes a crest, more or less elevated, which sometimes becomes visible, and which always is felt in passing by the successive upheaval and sinking of the ground. This movement is very improperly called saltatory, when in reality it ought to be considered as a phase of undulatory movement.

These principles once stated, it becomes of the greatest importance, from the point of view of the solidity of habitable buildings, to know the different degrees of conductivity of the terrestrial strata. For this we can have recourse to the remarkable and recent studies of Professor Fouqué, who by the aid of explosives and by the employment of electricity and photography has been able to obtain very precise results. Thanks to these studies we now know that different geological formations offer very different degrees of rapidity of transmission, the proportions of which are arranged in the following table for the principal strata:

In granite the mean rapidity is from 2.450 to 3.141 metres per second. In compact coal-bearing sandstone, from 2 to 2.526 metres; in less compact sandstone, from 1.190 metres upwards; in Cambrian marble, .632 metres; in the sandstone of Fontainebleau, .300 metres.

We are thus assured that the more friable and porous the layer is the less proper it is for transmitting vibrations, and also that its power of conductivity increases in direct ratio with the adherence of the molecules which compose it, so that a strong shock passing from a rocky piece of ground to one which is sandy loses, little by little, its rapidity and its intensity, and finishes by being wholly absorbed. In short, clayey, pebbly and dusty soil should be the least subject to receive and propagate heavy terrestrial shocks. This is the reason, for example, that Northern Belgium and Holland, formed from the alluvium of the Rhine, the Scheldt and the Meuse, have rarely been desolated by earthquakes, and the same can be said of all the countries where the geological structure resembles that of the Netherlands. In Italy also, although the land is generally volcanic, and the country very subject to convulsions, the zone comprised within the delta of the Po is, as a rule, exempt from them. In the month of March, 1873, a shock of very general violence, having its centre in the Paduan Campagna, shook the whole peninsula from the Alps to the very extremity of Calabria. Now, cities placed on the borders of the delta of the Po did not experience the shock, although they were only a short distance from the focus of radiation. On the morning of the 19th of January, 1873, a strong shock was felt at Rome, but the inhabitants on the isle of St. Barthelmy, which is formed of "made" land, had no knowledge of the event.

Herodotus has stated that in the Scythian region which surrounds the marsh Mæotis, by others called the Sea of Azov, the shocks are so rare that they are considered a prodigy. Now, this region is essentially oozy, because of the alluvium brought down by the several rivers which surround it, and especially by the Dneiper, the Don and the Kuban. A great part of Northern Germany possesses the same characteristics. It is for this same reason that Lower Egypt, comprised between Lake Mœris and the mouth of the Nile has always enjoyed a kind of immunity from terrestrial convulsions. In like manner Mesopotamia, formed by the alluvium brought by the Tigris and Euphrates, enjoys an analogous privilege. Persia on the other hand, although only a short distance off, has frequently been troubled by earthquakes.

The experiments of Dr. Fuchs have once more made it possible to determine an important point of the scientific theory which relates to the convulsions of the earth; namely, that vibratory waves are not transmitted in the same manner at the surface of the ground as beneath it. At the surface an instantaneous upheaval creates a series of three or four successive waves, so that the movement lasts quite a long time. In the depths of the earth, on the contrary, there is only one single wave, and the movement stops quite suddenly, as well in a horizontal sense as in a vertical. A characteristic difference also, which experiment has always confirmed, cannot be accidental, and corresponds perfectly to the two forms of vibration which have been mentioned above: at the surface the resistance is least for the transverse vibrations which become the prevalent motion and spread themselves about with the greatest freedom; but beneath the surface there is great resistence to transverse vibrations as well as to longitudinal ones, and the only movement transmitted is that produced by the shock, while that which results from the elasticity of the body is non-existent.

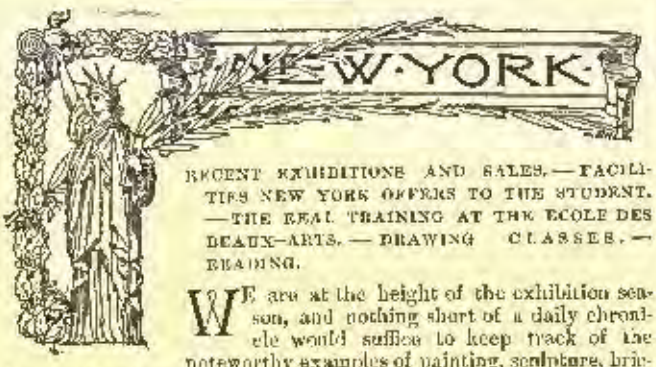
In the actual state of things, what is the best means to follow to make habitations as invulnerable as possible? The conclusions of Father Galli on this point are of capital importance for the arts of architecture and construction, and in a few words are these: "Observation has demonstrated that on the ground-floor shocks are not very easily perceived. Now, if it is true, that the movement is essentially vibratory, if the most intense, the most extended and consequently the most dangerous vibrations are those of the superficial layer, it must be inferred that the shock received through the walls is not easily transmitted to the ground which they enclose and that the foundations present a considerable resistance to the passage of the wave. If, then, a house should be entirely surrounded, at a little distance off, by a wall with deep foundations, very solid and well built, this protecting wall would absorb the violence of the shock and would suffer injury in place of the enclosed building. If, more than this, there should also be arranged a vacant space between this wall and the ground which supports the house, we should then believe that the building would be almost entirely protected against vibration. In cities this system would certainly seem to be very expensive, but this difficulty could be overcome by protecting several buildings collected into one group. Besides, the question of expense disappears when it becomes really a question of protecting human life, and rendering impossible irreparable catastrophes such as those which in these last years have had Andalusia and Liguria for a theatre. It is a question in short of constructing such harbors as shall shelter human habitations from terrestrial storms, and of protecting them by dikes and quais, which form an almost insurmountable barrier to the undulation of the ground, just as we construct harbors to protect our ships against the fury of the seas."

This is not to say the kind of protection proposed by Father Galli makes it impossible for a building to be overthrown; but what difference does that make? We have seen ships perish in port when the riot of the elements had reached such a degree of violence that it exceeded everything that human imagination had been able to foresee; but all the same, this has not afforded a reason for not building harbors for ships.

In any event, there is in this book of Father Galli's several ideas

[1] Continued from No. 687, page 92.

worthy of being studied by architects and constructors, who possess all the technical information needful for judging the possibility of making application of them. They can now establish rules on this subject when they know what are the kinds of soil which they ought to choose by preference for their buildings to guard them naturally, and protect them from violent shocks. H. Mereu.



RECENT EXHIBITIONS AND SALES.—FACILITIES NEW YORK OFFERS TO THE STUDENT.—THE REAL TRAINING AT THE ECOLE DES BEAUX-ARTS.—DRAWING CLASSES.—READING.

We are at the height of the exhibition season, and nothing short of a daily chronicle would suffice to keep track of the noteworthy examples of painting, sculpture, bric-a-brac and furniture passing before our eyes.

The Water-Color Society's exhibition was opened in a charming and novel manner this year by a brilliant costume ball. The ball was for the benefit of the Society of Decorative Art, and was a social and artistic success, the water-colorists courteously offering the use of the Academy, all draped and ready for their own opening. The exhibition was above the average, and especially charming in effect from the draping of the rooms with delicate, light-toned stuffs. Maynard's "Sirens," which took the Evans prize of $300 for the most meritorious water-color exhibited, was deserving of its distinction.

The exhibitions and sales of the Stebbins collection, with good examples of modern French painters, the Howell collection, with notable French landscape work, and three or four more really good collections can only receive passing mention, though any one of them deserves a column.

The sale of the late F. O. C. Darley's paintings and drawings was a vivid reminder of progress made. The Artists' Fund was no more and no less interesting than in other years.

The monthly exhibitions of the Union League Club mark a departure that is full of interest. Besides the usual loan of pictures by the members, they were asked to contribute from their collections rare specimens of porcelains of special types. Last month was devoted, I believe, to *sang-de-boeuf* glazes, and this month there is a really beautiful exhibition of blue and white. Rare pieces have been loaned by Mr. Walters, of Baltimore, by gentlemen from Washington and Chicago, and Messrs. T. B. Clarke, Charles A. Dana, James A. Garland, and other well-known collectors of this city have contributed. It is really a revelation to see such a wealth of rare and exquisitely beautiful examples brought out to illustrate a single small branch of art. Amongst the pictures, Frank Millet's "Old New Amsterdam" interior pleased me most.

I had nearly forgotten an acquisition to the Metropolitan Museum collections—Mrs. John Crosby Brown's recent gift of her collection of musical instruments. There are amongst them, I am told, many exquisite examples of artistic workmanship, delicate inlays and carvings of curious and suggestive forms. The only collection said to be comparable with it is the one at South Kensington.

I have been asked what facilities New York offers a young and ambitious draughtsman for pursuing his studies after office-hours, and I am somewhat puzzled how to answer. There are and can be but few opportunities for systematic evening study, but there are unlimited opportunities for learning and development. The first thing for a young man ambitious to rise in his profession to do is to create a sympathetic atmosphere about himself, and to so train his perceptions as to get the most good out of his surroundings.

When I went to Paris to enter the Ecole des Beaux-Arts, I was somewhat prepared to adapt myself to the conditions there, for I had enthusiastic and appreciative friends who had been there before me. Presenting myself and my credentials, I suddenly found myself member of an *atelier* or studio, one of a group of thirty or forty students under the direction of a well-known architect, a brilliant Prix de Rome man, and then engaged upon one of the public buildings. If I had counted upon this architect, upon the lectures or examinations, or upon the designs required under the programmes for my training, my time would have been wasted; and I say this not in depreciation of the school and its curriculum, but, on the contrary, to point out how much deeper than the mere courses of study is the real work done there. The students amongst whom I thus found myself thrown lived in a miniature republic, an ideal commune, with a body of traditions and unwritten laws, to which each must give loyal adhesion or withdraw. Each member took rank according to his achievements in the common pursuit, and all outside considerations were, so far as possible, eliminated. It was decidedly bad form for one member to be appreciably wealthier than another, and titles were not obtruded. One man, I remember, was known as the "Cassowary" on account of his tufted hair, and it was over a year before I discovered that his real name was an historic one, and that he was Vicomte. Our schooling disappointed me at first. Indeed, it was not until some time after I had returned to my own country that I fully understood all its advantages. The *nouveau*, upon being introduced and going through a few simple formalities, was put through a course of initiatory teasing, intended to test his temper and measure his goodfellowship. It was pretty severe sometimes, but never cruel or ill-natured. Once passed, the *nouveau* was admitted to companionship, but must not forget that he was a *nouveau* and knew nothing. He was expected to do cheerfully all the routine drudgeries for the more advanced men: stretch paper, grind India-ink, black-in the plans, or make tracings. These duties were gradually delegated to still newer arrivals, and progress depended upon individual quality. Each must still be helpful in lightening the labor of men above him by doing whatever he was best fitted for. One could give or take assistance in all the inessentials; the sketching-in of statues or of backgrounds, the laying of washes, or many other such things; but it was one of the unwritten laws—never, I think, transgressed—that no student should accept the assistance of a comrade in the vital and essential features of design, although counsel and criticism was constantly and freely given and received. Our *patron*, or director, spent but little time in the *atelier*, and most of the attention was given to the older men, with a word of encouragement here, or of warning there, to the others; just enough to keep them in mind. The students to whom he gave his greatest care were bound, in their turn, to look after the others. They thus had the added advantage of at once practising and testing all they learned, and the others gained, too, in that, instead of one director and teacher for a few minutes, they had several working at their elbows all the time, and so far companions and friends that modest doubts and aspirations could be aired without the paralyzing feelings inspired by the presence of such immeasurable superiority as the *patron's*.

Here, then, was the great principle governing our little community; a mutual helpfulness from the lower to the higher in things manual and an equal helpfulness from the higher to the lower in things spiritual, and with this, the constant progression of the individual and the liberty to attain the best it was in him to do. We lived together in an absolute community of interests. Went to the galleries and museums, went sketching, travelling, lunching, in knots and groups, and talked and fought and sang amongst ourselves. It was sometimes difficult to pick out the grain of architectural wisdom from the atelier chaff, but it is clear in looking back that we all thirsted for knowledge and power and even our play felt the influence of our more serious aspirations. I have given this bit of personal experience because I could not otherwise explain so clearly what I meant by a sympathetic atmosphere. It is perfectly attainable, here as well as in Paris although it does not always exist where one would most expect it. A young draughtsman should of all things, fight shy of offices where there are no enthusiasms for the things beyond the scope of the day's work, or the week's pay, better go elsewhere even if the pay be less and the daily work less ambitious, if only generous enthusiasms are at home there.

As to what disposal may be profitably made of the evenings, I can only make a few suggestions. The Architectural League is open to all draughtsmen over twenty-one and is not expensive. Besides, whatever may go on of interest at the meetings, the acquaintances and friendships formed will help to keep one posted as to what is going on elsewhere. Professor Ware gives a course of Wednesday evening lectures at Columbia College, to which all are welcomed, and which are charmingly instructive and bountifully illustrated.

It is worth all it costs and more to keep the run of the various exhibitions and to go often, with a fellow architect if possible. Paintings, sculpture, bric-à-brac, old furniture and many other interesting things are exhibited previous to sales and one soon learns to avoid the trash, so that besides the Academy of Design and the American Art Association you can count the Fifth Avenue Galleries and Leonard's rooms, and to give zest to an afternoon stroll places like Knoedler's, Bausserd, Valadais, Sypher's-Duveen's and the Japanese Trading Company. A little courtesy and tact will always open the way into these shops and a display of real interest will draw out a fund of interesting information.

A course of drawing from the figure or from casts can be taken in the evenings either at the Metropolitan Museum Schools, corner of 49th Street and 3d Avenue; at the Art Students League, 17th Street and Fifth Avenue, or at the Cooper Institute where those unable to pay are favored and where the work is more elementary: the Museum and Cooper Institute also have classes in modelling.

Reading is a more difficult matter, and outside of books of general reference such as are to be found in the Mercantile Library, one can only consult the architectural publications under restrictions, at the Astor Library, the Society and Lenox Libraries and at Columbia College. The hours and privileges vary so that it is impracticable to give them here, but a direct application personally or by letter will show how far they may be individually available. To study the more scientific branches, construction, strength of materials, perspective stereotomy, etc., the most practicable way is to get a few fellow architects to go in together and form a private class either for mutual help with good text-books or better, under the tuition of some recent graduate.

The one caution it occurs to me to give is to cultivate a live interest in all good art whether it be painting, sculpture, music, literature or the play and do not be afraid you are not perfecting

yourself as an architect because you are not always studying architecture. There are times when Henry Irving will do you more good than Vignola and when Wagner is more to the purpose than the best work on transverse strains. Architectural requirements are complex and involve artistic, mechanical, business and social questions of all kinds and degrees.

THE STANDARD CLUB'S NEW BUILDING. — THE FALSE REPORTS CONCERNING THE ACCIDENT AT THE OWING'S BUILDING.

PROBABLY no one fact shows so plainly the rapid change here from a comparatively small city to a wealthy metropolis as the increasing number of social clubs, together with the rapid increase both in number of members and wealth of the older ones. There are now in Chicago fully twenty such associations in a most flourishing condition. Of this number probably one-half have clubhouses that belong to themselves, and during the past month one of the older of these social organizations has opened its new home with the usual formality of a large reception. The building being finished and occupied, one is now able to examine it intelligently and pick out the points that do not appear to be in harmony with the usually accepted ideas of architectural composition.

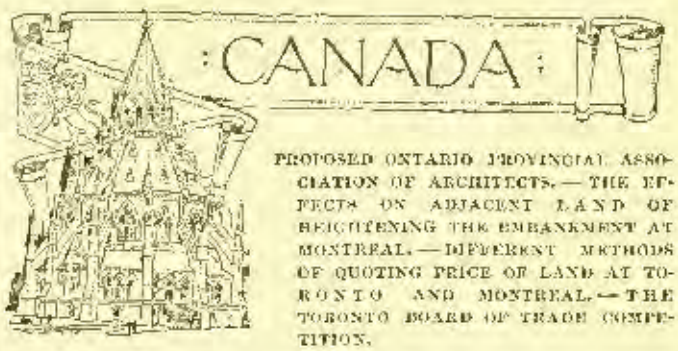
The new house of the Standard Club is located at the corner of Michigan Boulevard and Twenty-fourth Street, and, according to the daily press, has cost over $100,000, exclusive of land. The two street fronts are faced with Bedford limestone of a grayish tone. This stone, while one of the cheaper stones in our market, is still one of the best. It almost goes without saying that the structure is "rock-face," for nearly the whole city — or the architectural portion of it, at least — seems to have gone crazy on this kind of work, and nothing is thought of but rough and jagged stone: here, indeed, some mouldings have been cut, but their comparatively small number and the total absence of carving (except one minute line near the top where it is scarcely visible) give to the whole building the general rock-faced air.

If, as some claim, every building should by its exterior indicate what is its purpose, no one would be surprised if the public at large rarely guessed correctly the end and aim of this building. A more strictly commercial-looking construction it is almost impossible to imagine; as for beauty of outline, as well talk of the beauty of outline of a dry-goods box, to which in shape it very nearly compares. But, having such a plain contour, why, at least, the comfort and consolation of a good cornice with its attendant shadow was denied, is something that seems incomprehensible; for in place of some good lines and projections, one is left with the involuntary impression that it was maliciously clipped off, or else that the owners had the thrifty idea of eventually putting on some more stories, without the expense of taking down any useless cornice since the coping stone (the only member now there) would, with small outlay, answer capitally for a sill-course to the new story. The outline of the house being entirely devoid of artistic form, the effect of the structure could certainly have been greatly improved by some color effect, and an extremely careful study of the shapes and combinations of the openings. The former was certainly not even attempted, for the whole mass of the building (except a few buff terra-cotta panels under the windows) is an even gray, the color of the stone, and this monotony is made still more apparent by all the woodwork of the windows being painted the same general color as this facing, so that there is absolutely no relief for the eye. Had economical reasons rendered it necessary to use only one stone, a much happier result could, without question, have been obtained by a more careful study of the method of jointing the stonework. Above the first story one can discover no study of this kind, for through the upper three stories the thickness of the courses of stone are so nearly, if not absolutely, alike as to add monotony to the already monotonous color. Again, the shapes and combinations of the openings are not entirely agreeable to the eye, semicircular and square-headed windows alternate with each other in the same story without any apparent reason for such changes, while large and small windows, some extending through two stories and others only one, do not give a harmonious effect to the general exterior.

The main entrance, which is at the side, is one of the best features of the building, being a generous arch with a fine sweep. Unfortunately, the interior of the vestibule was left rock-faced, and, as a natural result, the fitting of the woodwork of the inner doors against this stone, though resulting in an irregular contour line, has not from an artistic point been what any one could call a success.

The gas-fixtures, both in this vestibule and at the sides of the entrance, are too insignificant and cheap to bear description, and, although the architects probably had nothing to do with their designing, it would certainly have been wise in them to have made arrangements for the one in the vestibule ceiling, so that it would have come in the centre of a panel, rather than in the middle of a moulding, as is now the case. The interior of the house is said to be extremely satisfactory, both in arrangement and decoration, and in many parts is very handsome. It is certainly to be hoped that such is the case, for the part of which the general public gets the benefit cannot fairly be qualified by any higher compliment than that it appears massive and bold.

From the wide publicity that has been given throughout the whole country to the accident that happened recently at the Owing's Building, an impression has gone abroad that it was a casualty of most serious nature, while, in fact, it was not so, as $500 will more than cover the cost of repairs. It was an accident that might have happened in any building of similar construction where workmen were careless, and, moreover, such things have happened in several of our buildings here without any notice being taken of it either by the daily or professional press, although the damage, certainly in one case, was nearly four times as great. Occurring, as it did, on Sunday, the Monday morning papers gave this particular accident all the space possible, in order to "fill up" what is ordinarily the most dry and uninteresting issue of the whole week. Reporters were flying around until late Sunday night, even routing some architects out of their beds to get their opinions — and they generally got them, though in more forcible than polite language. But, notwithstanding all the talk, probably not a dozen architects took the trouble to go around to the building the next day to look at the débris.



PROPOSED ONTARIO PROVINCIAL ASSOCIATION OF ARCHITECTS. — THE EFFECTS ON ADJACENT LAND OF HEIGHTENING THE EMBANKMENT AT MONTREAL. — DIFFERENT METHODS OF QUOTING PRICE OF LAND AT TORONTO AND MONTREAL. — THE TORONTO BOARD OF TRADE COMPETITION.

A VERY decided step has been taken within the last month by the Toronto Architectural Guild towards the establishment of the proposed Ontario Provincial Association of Architects. Draft by-laws have been prepared, and a copy forwarded to every architect in the Province, with an invitation to attend a general convention on March 21 to discuss the subject and provide actual and definite means for the object in view. The invitation bears the request that all the architects in each town or city will meet and go over the by-laws, with a view to expediting matters at the convention, so that from every place men coming to the meeting may be prepared to the fullest extent. The Hamilton architects, so the daily papers announce, have already met, and are taking the matter up warmly. From Ottawa comes an expression decidedly in favor of the notion, and the promoters of the scheme have every hope of the convention being a great success. Some architects in Quebec, who, of course, cannot share the benefits of an Ontario association, wish the Toronto men would go further and get up a *Dominion* association, but that is quite out of the question. Montreal architects, who are decidedly in the majority, must learn to control their jealousies, and the English and French elements must amalgamate first before any such universal scheme could be promulgated.

A few months ago I sent you an account of the works carried out by the Harbor Commissioners of Montreal in deepening the ship-channel of the River St. Lawrence. Another engineering scheme is being discussed which will probably involve an outlay of $3,000,000. It is proposed to widen the street (Commissioner Street) that runs along face of city, riverwards, to an extent that will give it an average width of ninety feet; to raise the present quay and wharves to the level of this street (they are at present some fifteen feet below, and entirely submerged every winter), and do away with the inclined roadways from the street to the quays; to build a parapet-wall to keep out the floods; and to construct an outer wall in the river, enclosing the whole harbor.

Apart from the question of cost, this great work as a whole cannot be carried out without a very careful investigation of the consequences likely to ensue. The first question is: Where will the water that usually occupies the space it is now proposed to fill up by raising the wharves and quays go to in the winter. As I have before explained, the river rises as much as forty feet in some springs, and if the water can no longer spread itself out to the northward over the city of Montreal, it is likely to overflow the south shore to an extent far more serious than heretofore, and the villages of St. Lambert and Longueille on this shore would be buried. There can be no doubt that the benefit of such a scheme would be immense to Montreal, and therefore the villages must, perhaps, go to the wall, but something must be done in the interest of the inhabitants to save them from sudden and overwhelming inundation. One night would

be sufficient to destroy the villages when the ice-dam gives way: the irresistible torrent of water, laden with tons of ice in blocks, would sweep the south shore clean. However, the engineers who have the matter in hand are not likely to do anything rash. Experience with other improvements of the kind in other places has shown that "after-effects" must be duly considered. When the Thames embankment was widened, and at Westminster and Chelsea the river was narrowed by one hundred feet for a considerable length, the flood-water in the spring, unable to get away as fast as before, spread out above London over a far greater area, so that even at Wallingford, at a distance of fifty miles from London, the floods are worse now than before.

With the prospect of an early spring, the building trades are brightening up, and there seems to be every prospect of a considerable amount of work being begun as the frost comes out of the ground. Usually the first of April is the day by which excavating work can be commenced, but, with the short winter and the lack of the usual amount of frost, such work will in all probability be started a fortnight earlier this year. The value of real estate seems to be steadily on the increase. Prices are rising rapidly, and new property has recently been put into the market. New districts, as they are opened up, are commanding very high prices. The rapidity with which Toronto is increasing in area is something astonishing, outlying suburbs being annexed, and neighboring districts being laid out for building estates north, east and west. Montreal is less favorably situated for such extension, owing to the "mountain" which bounds the city to the north at a distance of only a mile-and-a-half from the river. But the class of cities to which Montreal belongs is so very different from that of Toronto that the two places cannot be compared by the same standard of prosperity. Montreal, with its older foundation, has many disadvantages in the way of old and narrow streets, poor districts, such as Hochelaga and Griffintown, and then, as the great port of the Dominion, its quays, wharves, docks and canal-basins, and the accompanying store and ware houses, mills and houses for employés, render improvement, except by a very vast outlay of capital, difficult and almost impossible. Montreal can only spread itself out practically in one direction; namely, to the west, where Cote St. Antoine is a favorite suburb for private residences. As to the price of land in the two cities, that is not easily compared through real-estate reports unless the dimensions of the property sold are given, because in Montreal the price is so much per foot *superficial* of the whole surface, while in Toronto it is quoted per foot *frontage*. To speak of seventeen dollars a foot on St. James Street, Montreal, and four hundred dollars a foot on King Street, Toronto, is misleading to the uninitiated.

I note Messrs. James & James's letter in reference to the criticism on their plans for the Toronto Board of Trade Building in my letter of last month. I will only add, in conclusion of my allusions to the matter, that my remarks were made without any bias in my mind against them. I took the plans as they were before me, and made such criticism as they appeared to warrant.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and ad quate descriptions of the buildings, including a statement of cost.]

ENTRANCE TO THE YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, ALBANY, N. Y. MESSRS. FULLER & WHEELER, ARCHITECTS, ALBANY, N. Y.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATE 41.—ST. JAMES'S, LOUTH, ENGLAND.

[Issued only with the Imperial Edition.]

THE AGE OF FRANCIS I, PLATES 3 AND 4.—THE TOURNEY FIELD, CHAMBORD; THE GUARD-ROOM, CHAMBORD.

[Issued only with the Imperial Edition.]

PROPOSED HOTEL, KINGSVILLE, ONT. MESSRS. MASON & RICE, ARCHITECTS, DETROIT, MICH.

PROPOSED TWELFTH BAPTIST CHURCH, BOSTON, MASS. MR. EUGENE C. FISHER, ARCHITECT, BOSTON, MASS.

A FOUNTAIN. JATIVA, SPAIN.

HOUSE FOR CARROLL E. BOWEN, ESQ., ROCHESTER, N. Y. MR. THOMAS NOLAN, ARCHITECT, ROCHESTER, N. Y.

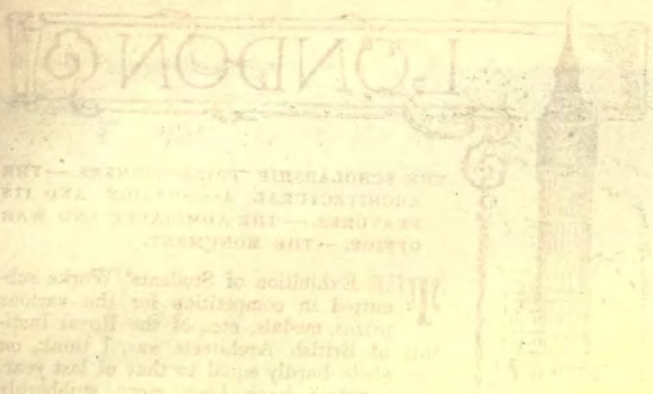
LONDON

THE SCHOLARSHIP PRIZE-WINNERS.—THE ARCHITECTURAL ASSOCIATION AND ITS FEATURES.—THE ADMIRALTY AND WAR OFFICE.—THE MONUMENT.

THE Exhibition of Students' Works submitted in competition for the various prizes, medals, etc., of the Royal Institute of British Architects was, I think, on the whole hardly equal to that of last year. Some prizes have been more stubbornly fought for, and others have brought out less talent, but this is always the case with these competitions. The "Pugin" student is Mr. C. E. Mallows, who worked, I understand, a good deal with Mr. Pennell, of *The Century* fame. His drawings indicate a thorough acquaintance with the pencil, and a knowledge which he uses to great advantage of the way to obtain striking contrasts of light and shade; an all important thing in a certain style of draughtmanship. He was run very close by several of the competitors. The "Gissell" medal was not awarded. Mr. Lanchester's charming color studies carried off the "Owen Jones" studentship. He exhibited the sketches which he made while travelling in Italy last year as "Aldwinckle" student, and it is a noteworthy fact that success in a minor travelling-studentship nearly always secures the winner a place in more important competitions, since he is able to spend the time that he uses in working out his studentship in preparing drawings for another. But this by the way, Mr. Lanchester's drawings are as good as any I have seen in the room for a long while.

The Tite Prize has produced nothing in quality equal to last year's competitions. Mr. Verity, son of the architect of the "Criterion," takes the prize for a pure and neat design in Italian Renaissance. The Institute Silver Medal for measured drawings was won by a Nottingham man, Mr. Allen, for drawings of Wollaton Hall, visited by the Architectural Association, last autumn, though Mr. Troup comes in a good second with some excellent drawings of St. John's College, Oxford. The "Soane" Medallion has proved *the* competition this year. Mr. Arthur Sykes was *primus inter pares* with a well-studied and careful design, with nothing very wonderful in it, but with everything very thoughtfully worked out. Mr. George Kenyon, who has studied in the Paris Ecole des Beaux-Arts, submitted a work in which the influence of his *alma mater* is strongly pronounced. There were one or two Gothic designs, as a warning to others, I suppose. The design of the exhibition was, however, one submitted under the title *España*. It is one of the most eccentric, extraordinary designs that can be imagined, but, at the same time, masterly and powerful, and striking in its originality. There is a Moorish feeling about the design, which the author emphasized by a really beautiful perspective drawing, with southern sky and Algerian surroundings. There was quite a storm in a tea-cup about this design. The judges, startled perhaps at its originality, passed it over. When their report, however, came to be read before the Institute, Professor Aitchison got up and moved that the judges' report be amended, and that *España* be awarded a Medal of Merit. He was backed up by Mr. Ewan Christian, a Past President, but their efforts were unavailing, as the Institute confirmed their Judging-Committee's report by the majority of five. This will serve to show you what interest this design has excited, and I dare say you will see it in one of the professional papers. The Godwin Bursary was awarded to Mr. Frank Stephen Grainger, M. A. These prizes, amounting as they do to over £250 per annum, are a great incentive to students to work here in England, and what I may venture to term your spirited action is founding a similar travelling-studentship for our fellow-students across the water has attracted notice here, and been warmly commended, though the breadth of your conditions, in opening your competition to students, "male or female, white, red or black," reads like a dry piece of humor. Nevertheless, let me promise the lucky man (or woman) a hearty welcome to the "auld countree," and we won't grumble even though she be a Pawnee squaw.

The latest move of our student body, the Architectural Association, has been hardly what you might term architectural. We have founded a Lyric Club under eminent patronage, and twice a month, under the soothing influence of the fragrant weed, offer up our devotions to the Muses. The Club has had an excellent effect in helping to bind together in the bonds of brotherhood the students at the Association of Architects. What a wonderful body this is, though I "say it as shouldn't." With past and present students, we have over one thousand names on our books. We carry on an illustrated journal and a sketch-book monthly. We have a Cycling Club, two companies in the Volunteers, and now a Lyric Club. We have representatives all over the country to aid the wandering student whilst sketching, and our classes, lectures, etc., are very numerous. Indeed, as you see, we are, excepting the Royal Institute of British Archi-


LONDON

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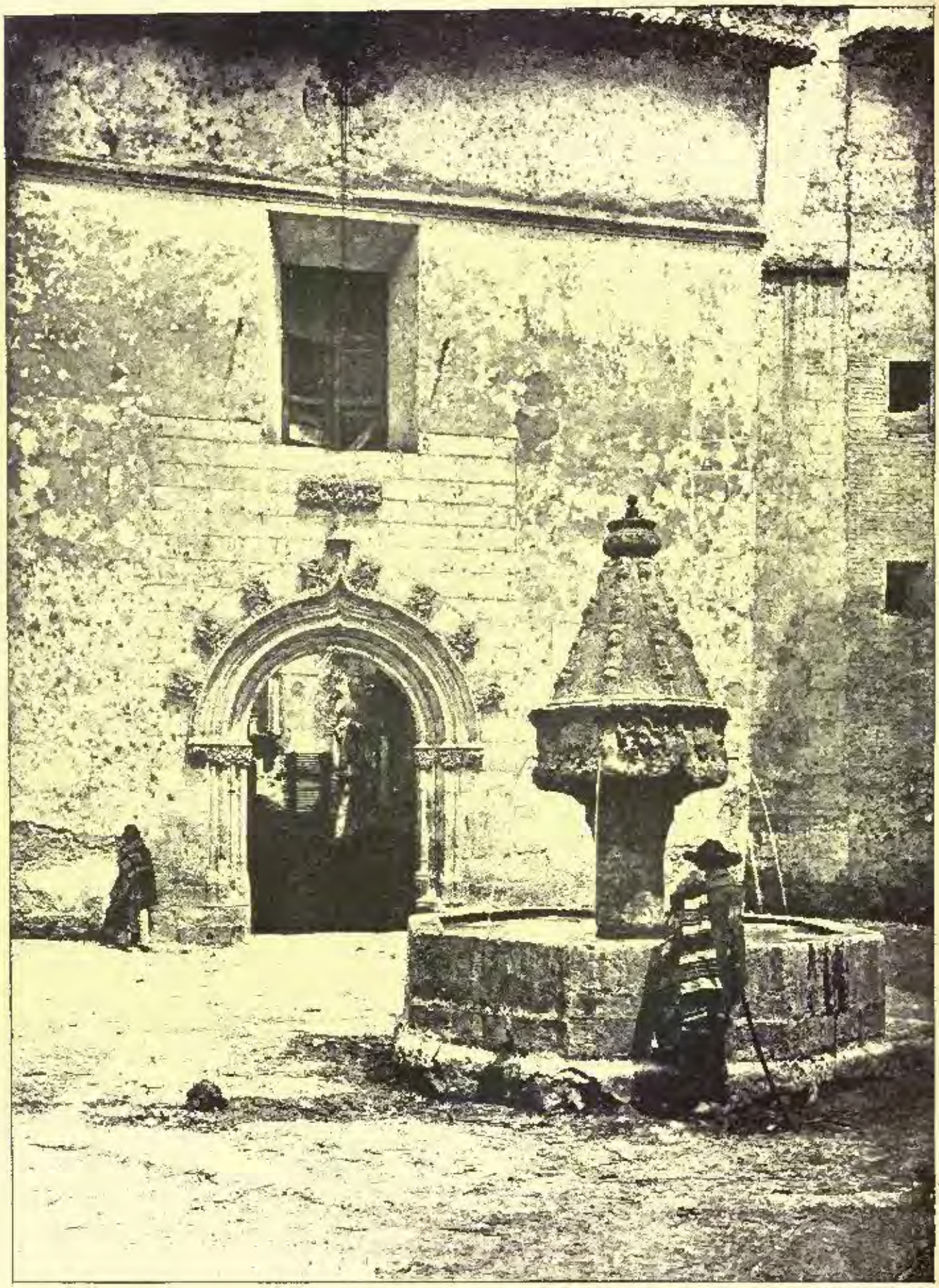

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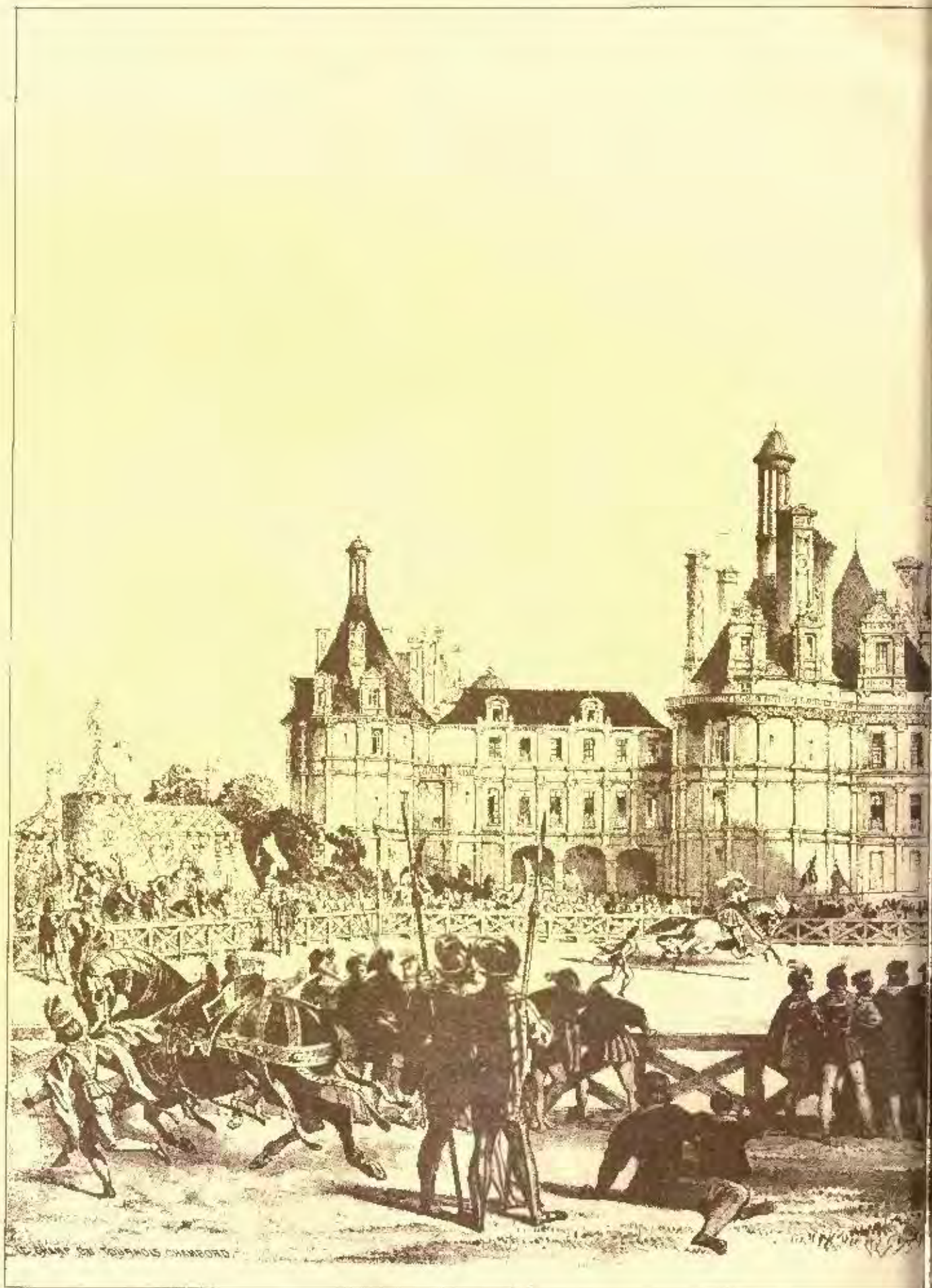
FOUNTAIN · JATTIVA · SPAIN ·

FRONT ELEVATION.



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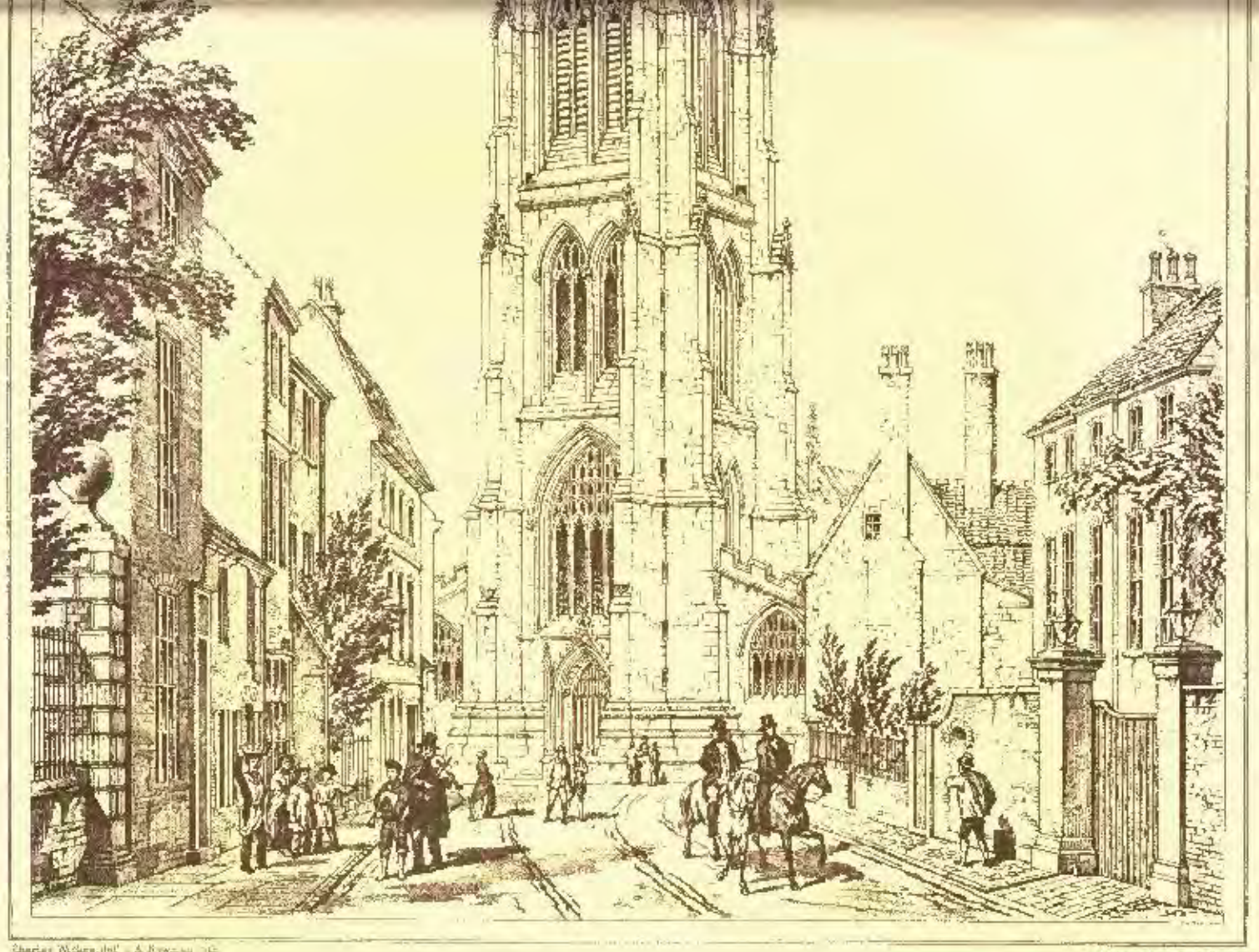

Charles Wilkes, del. & A. Rowman, lith.

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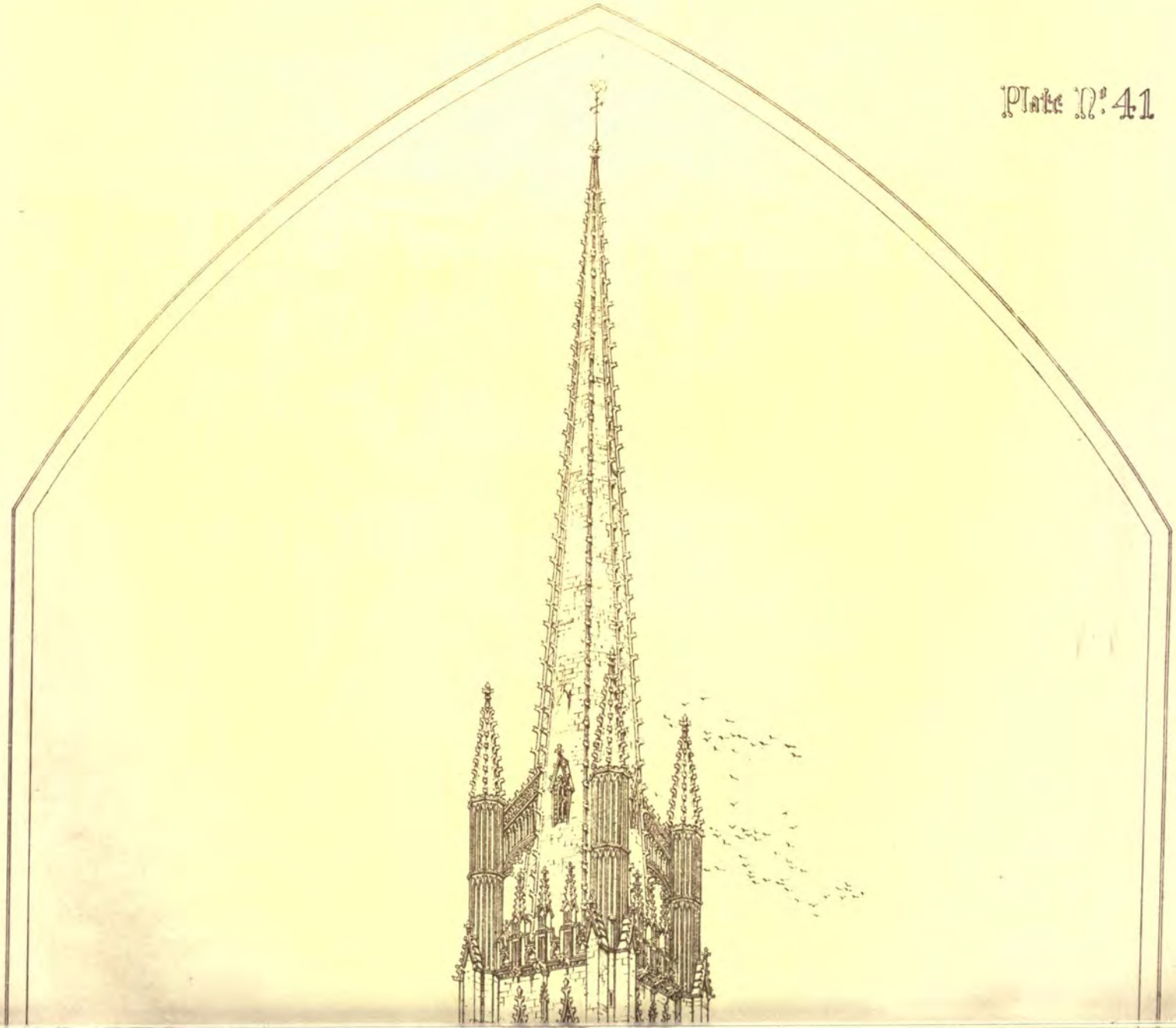
Plate N.° 41



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LAKE FRONT OF PROPOSED HOTEL
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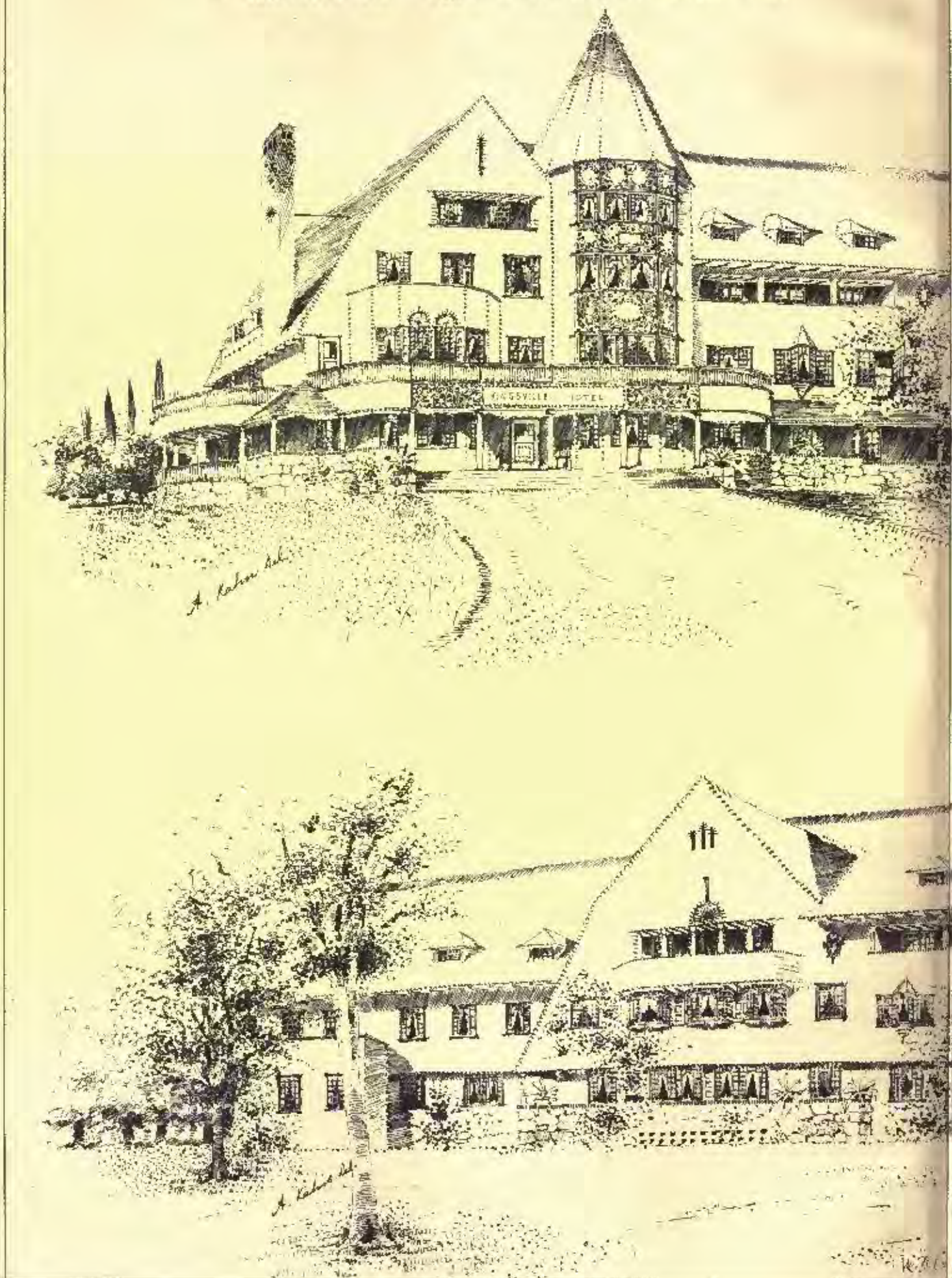

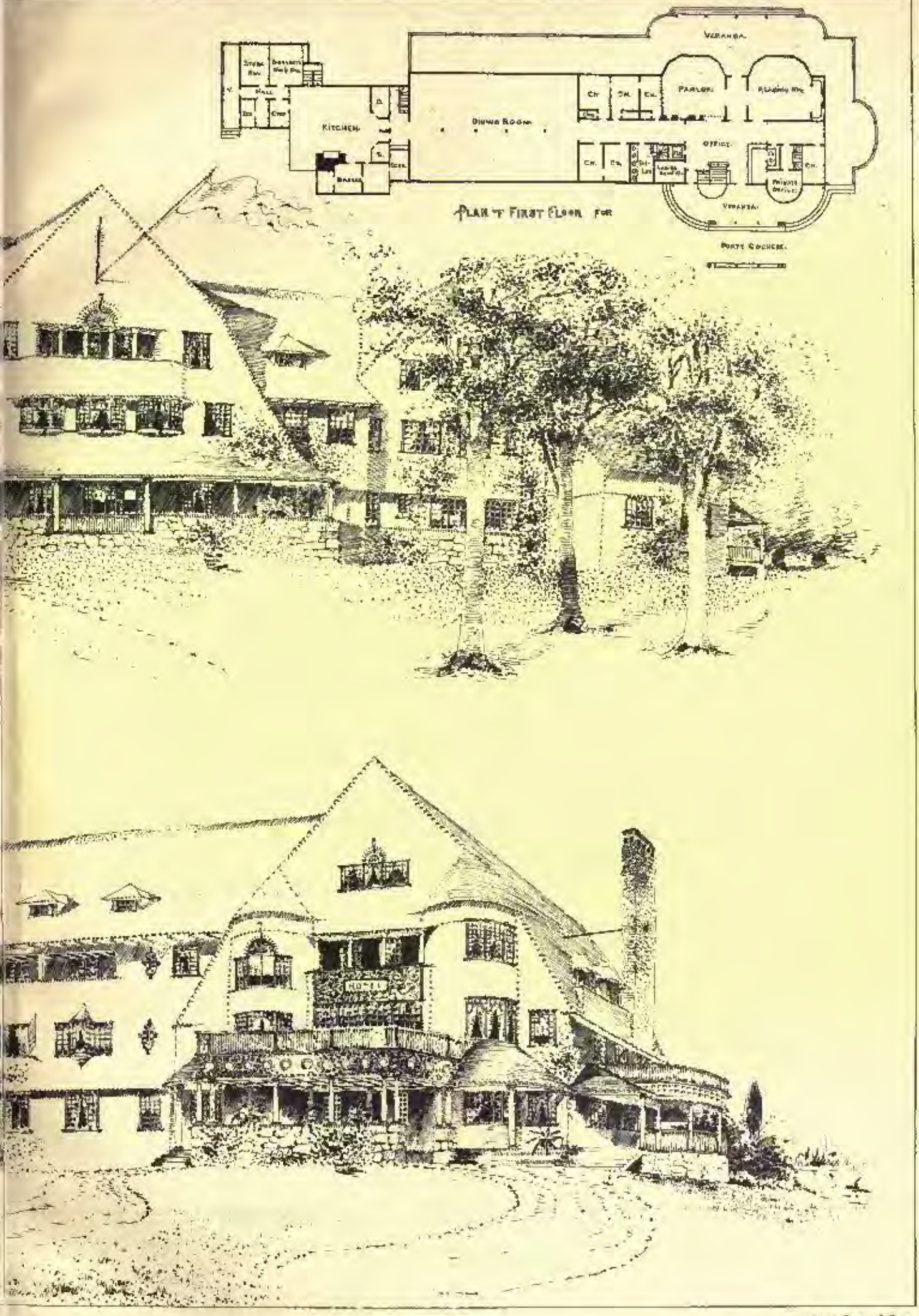

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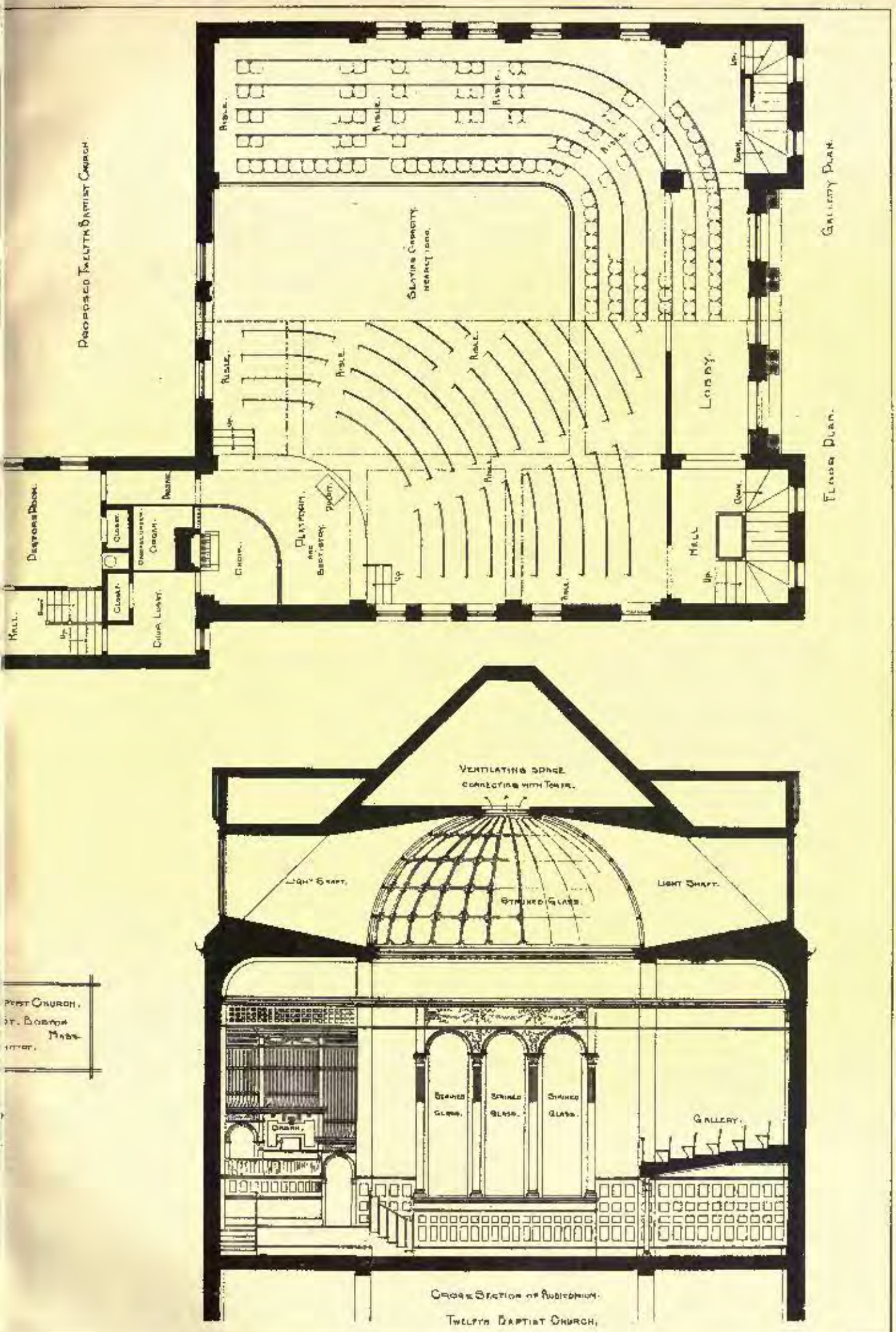

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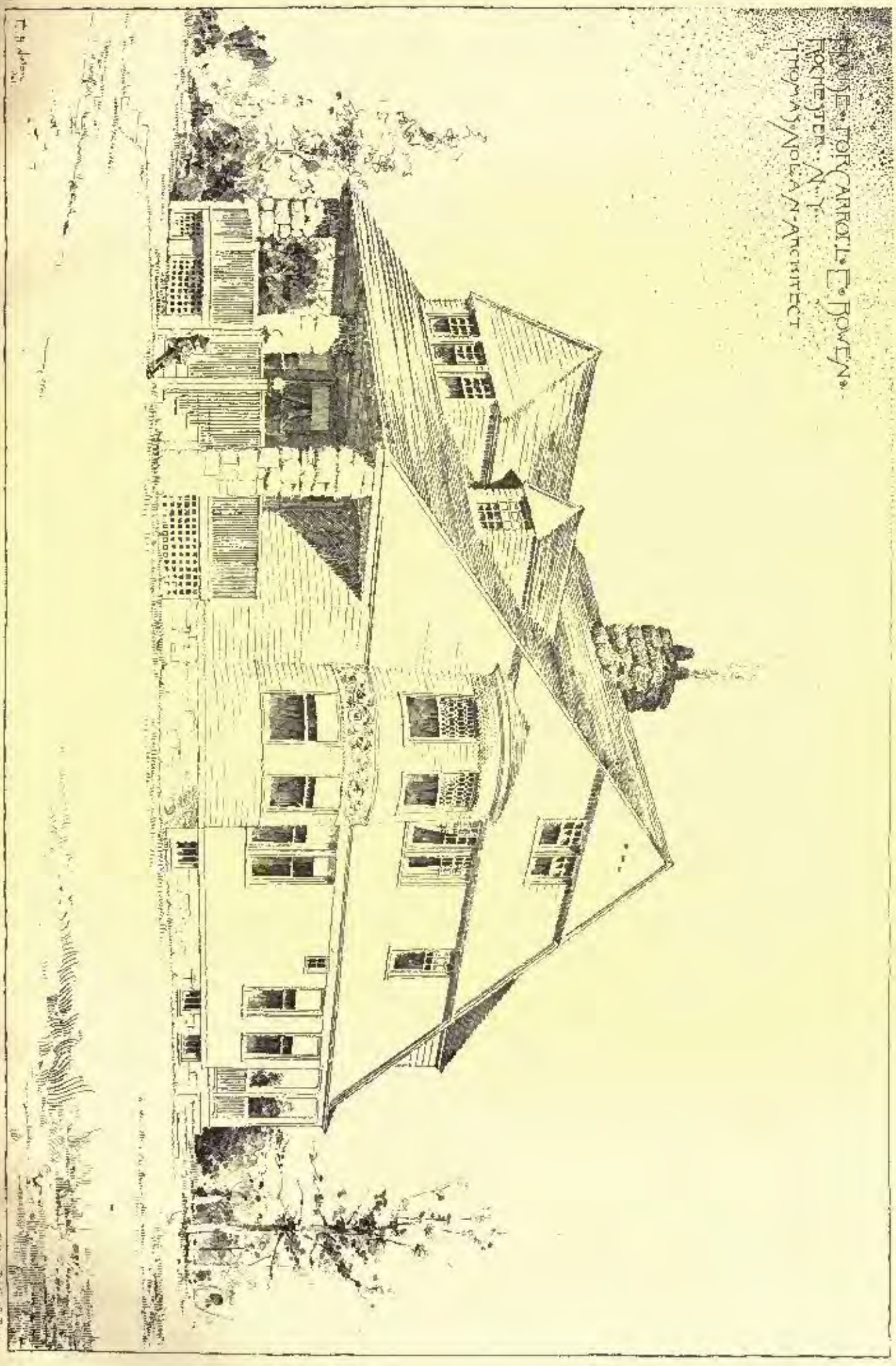


HOUSE FOR CARROLL E. POWERS
ROCHESTER, N.Y.
THOMAS NOLAN ARCHITECT

tects, the most powerful professional body in the kingdom, and, I am happy to say, disaffection is hardly known in our midst, and we loyally stand by the Institute through thick and thin, although, in times gone by, our relations with the powers that be have been well strained. Forgive this little outburst of enthusiasm, but it is difficult to avoid it when one gets on the subject of the Association.

The other night, our friend, Mr. Francis E. Masey, held forth on "London As It Is and As It Might Be," one of those purely theoretical subjects whose ventilation before an audience of architects seems quite superfluous. The lecturer proposed the appointment of a wholly impossible individual — a censor in art; upbraided architects for treating each façade *per se*, instead of in connection with its neighbors, and entered on the inevitable comparison with Paris. The discussion was of more interest than the lecture. It afforded Mr. Blashill, the Superintending Architect of the dying Board of Works, an opportunity of trotting out his pet idea of subjecting all our buildings to a perennial drenching with the fireman's hose, to clean off the dust and dirt that accumulates on them, and it enabled Mr. Bury to make a very energetic protest against the continual comparison of London with Paris. He said, and I quite agree with him, that the very incongruity of London produced a picturesqueness impossible of attainment in a modern Continental city, and that London contained features of interest — nay, beauty — peculiar to itself. I think the sensible remarks of Mr. Bury fitted-in with the prejudices of the meeting much better than the theories and sentimentalities of the lecturer.

Vacillation, vacillation! There is a rumor floating about that the Government has again abandoned its project about patching up the Admiralty and War Offices with the buildings I commented on severely in one of my former letters, and contemplate reverting to the original design of Messrs. Leeming & Leeming. Although it is uncomfortable to have a government that does not know its own mind, yet this time the pendulum has swung in the right direction, and I trust there is some solid foundation to the rumor.

The fears about the safety of the Monument, which I mentioned some months ago, have happily proved to be groundless. The erection has been very carefully tested from top to bottom by an eminent firm of contractors, under the superintendence of the City Architect, and has been found to be perfectly stable.

The fire demon has been busily at work again. His latest victim has been a beautiful county mansion in Wiltshire, which was erected some five or six years ago at a cost of £50,000 from Mr. Philip Webb's designs. The house was almost entirely destroyed, and a great quantity of beautiful carved oak and many very valuable works of art, including a large picture by Burne Jones, were all burned. Indeed, the total loss will not be much under £100,000. "The house was fitted with the latest patent fire-extinguishing appliances, but, owing to the cold weather, they would not act." — [*Daily Paper.*]

The elections to the London County Council have taken place, and, with the exception of five or six, all the members of the old Board of Works who sought the suffrage of the rate-payers were rejected at the polls. There is some talk of the new County Council building a new house for themselves on the Thames embankment. The probable chairman of the new body will be the Earl of Rosebery, K. S.

: PARIS :

THE COMING EXHIBITION. — INTERNATIONAL EXHIBITIONS, THEIR GENESIS AND HISTORY. — THE PRIX DE RECONNAISSANCE DES ARCHITECTES AMERICAINES.

My next article will very likely be dated on the day of the opening of the Exhibition. The great question everywhere is this, Will it be ready? Those who are confident reply in the affirmative. Others maintain the contrary, either through a spirit of pessimism or of opposition, for there are, it must be acknowledged, many enemies of the enterprise, and these last cry out at the top of their lungs that it is very possible that on the day of opening there will be exhibited only unopened packing-cases and unfinished show-cases. These two ways of looking at things are evidently exaggerated. It is time to acknowledge the truth: no one must be deceived, and the lie must be given to those who have an interest in embarrassing the success of the Exhibition. Let us confess it, we are behind time; but I maintain, and I am in a position to know, since I am employed here amid the Installations, this delay is not general, and particularly does not apply to the industrial sections; this is very important. All the galleries in these sections will be ready if the exhibitors think it worth while to arrive with their goods in time. They will have, as a matter-of-fact, two long months for their installations, which is certainly more than enough. Where delays are to be feared, particularly if the bad weather persists, is in the two palaces of the fine arts and liberal arts. Here there is surely no time to lose, for it will not be possible to begin the installations at a seasonable time because of the delays in the execution of the work — delays arising from several accidents which have brought about changes in the original plans. But, thanks to the activity displayed and the night-work, we shall get through all right in a fairly satisfactory way. People were able to convince themselves of this at the time of the visit of the President of the Republic on the 13th of January, a visit which produced a very good effect, since the public being invited were able to take account of the progress of the interior work, which they had not been able to inspect from outside the enclosure of the Exhibition Grounds.

And now, before speaking in my next article of the curiosities and distractions of the Exhibition of 1889, let us glance at its predecessors and the history of international exhibitions. From what epoch dates the first exhibition? A Greek historian of the second century (Athenæus) reports that under Ptolemy Philometer there was given a pompous display where this Pharaoh caused to be exhibited by the merchants of Thebes and Memphis everything which Egypt produced in the way of luxury. If this statement is exact, it would prove that there is "nothing new under the sun," and that the first national exhibition does not date from yesterday; but it is allowable not to accord too great confidence to these statements of the ancient historian; and I only mention the fact by way of curiosity, without attaching to it the least importance. It is only in the year VI of the Republic, in 1798, that there took place the first gathering like an industrial exhibition. It was the writer François Neufchateau, a member of the Academy, who, on the occasion of one of the public fêtes given by the Directory, had the idea of collecting and grouping together for the sake of comparison the products of French industry. This exhibition lasted for thirteen days, and 110 exhibitors took part. At night the lamps were lighted, and the number of visitors was great. Afterwards the Government encouraged these undertakings, which took place at several later dates and finally assumed a certain importance, thanks to the competition of the provinces and the colonies in proportion as these developed. But there came a time when the need made itself felt of comparing the different products of the nations, and gathering these together in a universal exhibition. The first of these dates only from 1851, and took place at London. Each country was represented there with its national characteristics. It was an enormous success, and all Europe passed through the Crystal Palace: but, curious and regretable to remark, the fine arts were absolutely unrepresented. The glory of France was upheld by 1760 exhibitors, who obtained a large number of recompenses.

The United States followed the example of England. But the universal exhibitions which are truly memorable are those which took place in Paris in 1855, 1867 and 1878. The Exposition of 1855 was decided by a decree of Napoleon III, dated March 8, 1853. It was not merely an industrial exhibition like that at London; for by a second decree, dated June 22, 1853, which declares that the perfecting of the industries is intimately connected with the fine arts, a section of painting, sculpture, engraving and architecture was especially organized. A general commission, placed under the presidency of Prince Napoleon, was arranged and divided into two subcommissions, one having charge of Industry and the other of the Arts. Among the names of the commissioners of Fine Arts we find the names of the celebrated artists Eugene Delacroix, Ingres, Henriquel-Dupont, Merimée and Visconti. The general commission decided that in the interest of industrial art and the visitors, the Exposition should be a place of sale. They decided likewise, and this was an innovation, that the visitors should pay an entrance-fee. This rate varied, according to the day and the season, from twenty centimes and one franc to five francs on Friday, from the 16th to the 31st of July, and two francs from the 1st to the 9th of November. All this was complicated enough. The visitors turned into the treasury in this way a total of 3,302,484 francs for the Department of Fine Arts, and 2,506,104 francs for the Department of Industries. The Exhibition took place in the Palais de l'Industrie, which at this time was connected with the panorama of the Champs Elysées. Besides, it stretched through other galleries fully to the Quai de Billy and the Avenue Dantin for the Department of Industries, and the Avenue Montaigne for the Fine Arts, and the number of exhibitors was about 23,950. At the Exhibition of 1867 which remains a triumph for France, there were 52,000 exhibitors, and it was visited by 30,000,000 of people.

It is easy to recall the general plan, attributed to Prince Napoleon. It was composed of a central garden surrounded by seven rows of concentric galleries, which formed an immense ellipse, cut transversely by sixteen streets, each known by the name of some country. One of the successes of this exhibition was the gallery of the History of Labor, where machines in motion showed the transformation of primal matter. For the first time, also, a large space was devoted to social studies and to examination into the methods of education and instruction.

In 1878, France, hardly recovered from the disasters of 1870 and and 1871, summoned Europe and the entire world to a grand exhibition, showing thus her vitality and her energy. The general disposition is still present to the memory, and we all recall the success and animation of the Street of Nations, where each country was represented by a typical piece of national architecture. We recall also that it was in connection with the Exhibition that the Palace of

the Trocadéro was built, and that there was transformed into gardens, terraces and cascades all of the hillside which extended from the Pont de Jena to the Quarters of Passy and the Arc de Triomphe.

In 1878 the exhibitors numbered 52,800. Paris entertained more than 40,000,000 of visitors. They accused the Exhibition of 1878 of one defect, however, which certainly cannot be laid to the charge of the coming Exhibition. It was not a lively affair. Places of pleasure were distributed too promiscuously and strangled by the larger buildings. The Exhibition itself was closed at night, even the parks and gardens. This year they have, on the other hand, sacrificed the regular buildings of the Exhibition, that is to say, the industrial galleries, to those which are scattered through the gardens. These assume a great importance, and at night will present a fairy-like aspect. Also in spite of the larger area, which is really occupied, the exhibitors will only number about 12,000. Of the eighty-four hectares which the enclosure of the Exhibition contains, only twenty-nine will be covered with buildings.

I have already spoken of the general organization and of the direction entrusted to the three directors general, M. Alphand for the works, M. Berger for the exploitation and installation, and M. Grison for the finances. I will add to this the information contained in the third article of the rule regulating entrances: "The right of entry to the Exhibition shall be fixed in the following manner: By day one franc for each person at the hours of general entrance; two francs per person during the hours devoted to study; at night, two francs per person for week days and one franc on Sunday; season tickets 100 francs each for the whole duration of the Exhibition; twenty-six francs for subscription-cards delivered to the members of the commission and committees of the Exhibition. A weekly bulletin will be published in the official journal, and posted everywhere it may be necessary, which will inform the public of the hour of opening and closing the departments belonging to the Exhibition. The same method will announce the hours particularly devoted to study and distinguished from the public hours." And now let fine weather and sunlight illumine and enliven the day of opening.

I must not forget before finishing this letter to speak of the first competition which has just been held at the School of Fine Arts for the *Prix de Reconnaissance des Architectes Américaines*. There is no call for again mentioning the effect which this gift, so delicate and so ample, produced here, and which every year must recall to us and lighten the bonds of comradeship which distance cannot break. The subject of the competition was a monument symbolic of artistic fraternity. According to the programme it must present a temple or a triumphal edifice dedicated to Art, placed above a sub-basement, and so raised as to dominate the whole composition, accompanied by porticos, galleries, open staircases, etc. Nine contestants took part in the competition, which was extremely interesting. It was, however, rather difficult to avoid the appearance of a funeral monument, as several contestants found to their cost. The prize was awarded to M. Huguet, pupil of M. Blondel; and "*mentions*" were voted to Messrs. Adolphe Henry, pupil of M. Guadet; Eustache, pupil of M. Ginain; and Jankel, pupil of M. André. Here are four artists at any rate who should owe to their American comrades a feeling of gratitude; and you know very well, you fellows over yonder, that we will always join our good wishes to theirs.

M. Brincourt.

THE GROSVENOR GALLERY.

A CENTURY OF BRITISH ART; FROM 1737 TO 1837.

London, January 21, 1889.

TO-DAY this exhibition opens to the public with a second series of pictures painted within the above dates. Sir Coutts Lindsay and the management may be congratulated on having secured a thoroughly representative collection of a magnificent period, many of which have never been exhibited before, and nearly all of high artistic interest. It worthily sustains the reputation of the Grosvenor, and, for weeks to come, will attract all the artistic world. The pictures are hung with great judgment, each room having a special interest of its own.

Every one knows the two large galleries and the two small ones of the Grosvenor in Bond Street.

To begin with, the largest and "West Gallery," where, as usual, most of the gems were collected.

Mrs. Jordan's large portrait, by Romney, stands out, sweetly gazing into the room from a park, dressed in a simple white muslin, cut half-low, with elbow-sleeves and a pink sash. The fair hair, waving round the face and neck, is surmounted by a small white cap. It is a happy, delicate young face and slender figure, painted evidently in the heyday of Mrs. Jordan's life and beauty — before the shadows came, and she was repudiated and forgotten.

Romney was a charming painter of women's faces. He caught their soft witchery and smile, which make his portraits irresistible. Note his many portraits of Lady Hamilton, whom he worked up in every sort of fancy and attitude. It is said that for years he was never completely happy except when she was posing before him.

No. 7 is his Lady Hamilton as "Miranda." She looks like the laughing genius of a storm, with her head thrown back, her red auburn hair waving in disorder, and her bare right arm raised. This lovely creature, who took captive so many hearts, was the daughter of a common housemaid, almost destitute and uneducated. She first became known to the public through a quack doctor, who exhibited her as the "Goddess of Health." Sir William Hamilton, ambassador at Naples, married her. She became the favorite of society there, and, as every one knows, was the love of Nelson's whole life. Whence came her subtle charm? — with that innocent mouth and radiant expression?

Romney has a portrait of himself, No. 81, as a young man — so realistic that he might have belonged to this period, and painted it yesterday. He is in a slate-gray coat and white cravat, holding his chin with one hand, and lost in thought.

George Moreland has no less than twelve pictures here, all sunny and full of out-door life and movement. Who would think the best of them had been painted in King's Bench Prison, where he was constantly incarcerated for debt, and only painted his way out for short intervals.

His "Lost Kite," No. 1 of the catalogue, has become entangled in the upper branches of an oak. Note the *tree*, so strong and branched, while the new kite is so transparent and fragile that you long to help the unhappy urchins below to rescue it uninjured.

His Nos. 28 and 30 are called "Partridge Shooting." They seem to plant you in a stubble-field at once, and keep you on the *qui vive*, gun in hand. Then his two pictures of girls, one called "The Surprise," the other "The Billet-doux." The brilliancy of the scarlets, and blues, and greens in their draperies is wonderful. These are the very pictures that come out so well in mezzotint, and are now fashionable got up in little old-fashioned frames of white and gold.

Another of his, No. 81 — "A Summer Afternoon" — in which a farmer and his wife sit lazily beneath a "moreland tree," while their children play on the grass with a dog.

Perhaps the best of all is a lovely group, which he calls "A Happy Family," No. 87, a mother with her three children in a garden, who gather flowers for her, and which she seems to explain to them botanically.

Sir Joshua is here, of course, in No. 3, "Lady Elizabeth Keppel" (one of the famous portraits from the collection of Lord Albemarle), a conventional-looking lady in conventional dress of white, with white lace fichu and pearl ornaments, which have all faded and blended away together into a delicious cream-color. (The painting of the hands in this picture seems greatly scamped.)

His portrait of Mrs. Morris, No. 5, has great delicacy of touch and color. Many other portraits of his are shown. Among the most remarkable, one of Laurence Sterne (author of "*Tristam Shandy*," "*Sentimental Journey*," etc.) It is a very large picture, and well known as the one oft-quoted by the phrenologists, who say that, in sitting down and resting his elbow on the table, Sterne involuntarily placed his forefinger to his forehead on the very bump which was the sovereign point of his character.

Sir Joshua has also a fine picture of a "Child Crossing a Brook." A sturdy little maiden, about ten years old, barefoot in a stream, clasping round the body a shaggy and reluctant terrier; she wears a blue gown over a yellow petticoat. These colors, as well as the reds of the flesh tints, are much faded away, but the *real* child and the *real* dog are left.

Hogarth has a scene from the "Beggar's Opera," the colors quite as good as ever. The picture is in its original frame, with a carved head of Hogarth himself on the top of it. Hogarth has two others of very conscientious work in No. 103 and 108, "The Thornhill Family" and "The Punch-Bowl," both being strong contrasts of humor. One cannot help smiling at the exceedingly proper Thornhill family assembled to tea in their oak-panelled room; they look like a family of starched old maids and prim old bachelors, doing what they consider the correct thing, but are only too evidently thoroughly bored with each other. Tea is being poured out into exquisite Nankin blue cups, and handed round by the youngest bachelor, but no one seems either "cheered or inebriated." Hogarth, I believe, eloped with the eldest Miss Thornhill. In "The Punch-Bowl" ten men are carousing in a tavern. In the centre of the table is a large bowl of punch, which is being served out with a ladle. One man has fallen prone on the floor, and another seems very likely to follow him. It is the juxtaposition of these two pictures that brings out all the fun in them.

"Manlius thrown from the Rock," by Etty, No. 107, is the back view of a nude, foreshortened male figure, sliding downwards from a broken cliff of rock — an ambitious figure to have painted, and in better color than most of Etty's. So strong is the drawing you feel giddy to look at it.

Sir Thomas Lawrence has a very fine, full-length portrait of Lord Castlereagh, in whose refined, sad face one tries to find a clue to his inexplicable suicide.

Turner has two pictures — one of terrific grandeur, "The Avalanche," and another a peaceful idyllic scene on the Thames, with a view of "Pope's Villa."

In "The Avalanche" we have all those magnificent natural and atmospheric effects of which Turner was so great a master; while "Pope's Villa" is a contrast of a serene, glowing, sunlit sky, green trees and soft distances.

Sir David Wilkie's "Blind Man's Buff" seems still being played as merrily as it was a century ago, while in his "Penny Wedding" the bride, the bridegroom and bridesmaid are still dancing on.

John Cotman's "Homeward Bound" is a notable picture of a great three-masted vessel in full sail, surging towards us through the green water, while the sun has just set in broad bands of crimson and gold across the yellow sky.

One of the small rooms is devoted to Constable with a glass-case containing his relics. His color-box and palette, and even some little lace shirts and caps he wore as a baby. His work as a painter was sketchy but vigorous; he used a great deal of black in his brush, and laid on heavily. His admirers consider him the greatest painter of natural landscape.

Another room was devoted to pastel portraits, many of which I heard Mr. Pennell and other artists loudly admiring; but, to me as an unprofessional critic, they looked cold, glaring, blue and crude.

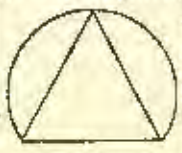
ARCHITECTURAL EVOLUTION.[1]—II.

Tower of the Cathedral, Worms.

IT is time, however, to notice that important feature which had more to do than any other with the change in the character of architecture. The arch is one of the earliest forms of construction, and is coeval with the pyramids; it is found there in the rudest construction, but, nevertheless, perfectly adapted to its uses. The pointed and semicircular arches are alike met with, but they are only used constructively. It was not till Roman days that it was brought into prominence as a feature of architecture.

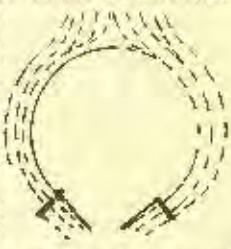
The object of the arch is, in the first place, similar to that of the lintel — to arrest the downward pressure of a superincumbent weight, that the material beneath may be omitted and an opening be formed. But the arch had a higher and more responsible duty to perform — a lintel merely arrests the pressure and bears the whole of the weight, the arch distributes it. In later days, when radiating joints were employed, an additional function was given to the arch, that of *directing* the pressure into certain channels. Radiating joints were for centuries unknown, and the arches were formed of stones raised in two piers, each stone as the piers rose projecting beyond the face of the one below it, in the direction of the other pier, until these projecting stones so nearly met that a single stone closed the intervening space and formed the apex of the arch. The distribution of weight was effected often in a still ruder manner. Two stones placed on end inclined towards each other and touching at the upper ends, have, in many instances and in many ages, done duty for the arch. The Greeks required no arch in the construction of their orders, their columns were placed so near together that the horizontal entablature required no additional support. But, the Romans, as I have remarked, put their piers so far apart that the heavy cornice running between them must, of necessity, have support; a pier in the centre would not do, and they wisely made use of the arch. Bringing it out from the obscurity of tombs and merely constructional purposes, they set it in the light of day, constructed it of dressed stone and made it an object of untold usefulness. Hitherto it had been but a piece of "construction," now it was to be "ornamental construction," and was to take its place as a feature in the art. This utilization of the arch as a feature was to alter the whole style of architecture, and this early date may be said to be the dividing line between the distinctive characteristics of Classic and Gothic architecture, and all that preceded the one and followed, and will follow, the other. The horizontality of the one was to give place to the verticality of the other. Heathenism was to make way for Christianity. The arch was to take the place of the beam or lintel, and the vault — the lateral continuation of the arch — the place of the flat roof; nor was this all. I have alluded to three of the functions of the arch — that *of arresting* the downward pressure of the wall above it, that of *distributing* it and that of *directing* it into particular defined channels; but, it was to do something more than this, it was to *collect* pressures from various points, and then take them into the required channels.

Mr. Ruskin has a very poetic idea as to the origin of the arch. He says in his "*Stones of Venice*": "Let us watch the sun for a moment as it climbs: when it is a quarter up, it will give us the arch *a*, when it is half up *b*, and when three-quarters up *c*. There will be an infinite number of arches between these, but we will take these as sufficient representatives of all. Then *a* is the low arch, *b* the central or pure arch, *c* the high arch, and the rays of the sun would have drawn for us their voussoirs." He goes on to say, "The central and last group are the most important. The central round, or semicircle, is the Roman, the Byzantine and Norman Arch." "The Horseshoe round is the Arabic and Moorish Arch and its relative pointed, includes the whole range of Arabic and Lancet, or Early English and French Gothics. I mean of course by the relative pointed, the entire group of which the equilateral arch is the representative." I have not sufficient presumption to attempt to overthrow the theories of so great a man as John Ruskin, who has a wonderful insight into the intricacies of art and of the meanings of the various parts and to whom we all owe the greatest respect.



Perhaps there is no one of the present day who loves art more dearly, than he, — who sees its divine origin more clearly, or who has by his lectures and writings done more to instil into the minds of hearers and readers a higher sense of the duties of those who would be expounders of the teachings of art. It is a matter of small moment to my readers that I have not yet been converted to the theory Mr. Ruskin holds about the origin of the pointed arch or the truth and beauty of the Arabic or horseshoe arch. I do not dispute that the idea of the semi-circular arch may have arisen from the rising or setting sun, for the Egyptians were great sun worshippers and must have been struck with the beauty of the circle and its parts. But I venture to think that they would have used the low and the high arch as much as the "central" or semi-circular, had they thought of it, but that they did not, is proved by the fact, that the pointed arch was in the first instance only used in the rudest form, very occasionally, as if by accident rather than design. Their very method of constructing the arch with horizontal beds may have been the accidental means of the discovery of the pointed, but, when discovered, they made no particular use of it. Had they done so, where would have been the "Classic" architecture?

In their heathenism they had not sufficient enlightenment to strive after verticality, and, therefore, they could not grasp the idea of the arch at all as being worthy of display, and I think we must look to construction as the origin of the pointed, and this investigation I must leave for the present. The Arabic or horseshoe arch is not a true arch, *i. e.*, an arch in which every particle has its particular work to do, and no part of which is idle. It is a piece of "*constructed ornament*," not "*ornamental construction*." The continuation of the curve below the springer line is utterly useless for the work of the arch, and never could be of use unless the supporting piers had been placed as shown in the diagram, so as to carry on the pressure in the same direction, which would have been absurd.



With the piers vertical, the thrust must have gone down in the usual direction, and reached the caps of the piers in a vertical direction, and, doing so, this inward projection is useless. It simply adds to the weight the pillars or piers have already to bear, and may be classed among the useless ornamentations that are indulged in by those who are ignorant of the true spirit of architecture.

For many centuries after the Romans brought the arch to light horizontal wood-ceilings were used, and they continued to be used here and there at the same time as vaulted roofs.

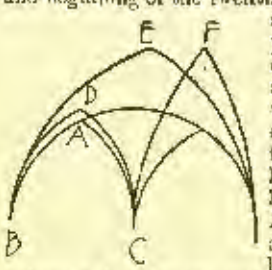
The dome is the earliest development of the arch for roofing purposes, and it is the roofing problems that resulted in the introduction of the pointed arch. Circular buildings, or even buildings square on plan, were roofed over with a dome, and then those whose naves were made up of a succession of squares were roofed with a succession of domes. The attempt was made to make the one covering to the nave do for "ceiling" and roof, but the height that was sufficient for the interior dome was always found too stunted for the exterior, and the stone roof was finally used as a "ceiling" only, while a wooden roof was erected outside this to throw off the water and protect the stone vaulting.

The barrel or tunnel is another method, and a very simple one, of roofing over a nave, and there are many examples extant. It consists of an arch like a tunnel, extending from one end to the other of the church. But I must say something here about the plans of the churches, or else the difficulties to be overcome in the roofing question will not be easily understood. The churches were transformed basilicas, and the basilicas were the Roman business buildings. They consisted of nave and aisles — oblong — and one end terminated in an apse. In the apse were the magistrates' seats, and in front of them the altar. Very little change was required to make the building suitable for the Christian worship. The seats of the magistrates were removed, and the altar placed nearer the wall they had been against. The apse was railed in, and finally a choir was formed, which, raised about three feet above the floor of the rest of the church, became the chancel arrangement of the present day. High up in the nave walls, above the aisle roof, were small windows. There was no triforium, but the space usually occupied by a triforium was here used for decorative purposes. In the sunny south fewer and smaller apertures were required for the admission of light than in more northern climates. It was rather an object to exclude the brilliant daylight, but, as churches were erected farther north, more light was demanded. But hitherto the plan of each section or bay of a cathedral had been square, and the spring of the tunnel-vault came down very low upon the walls, so that there was little space for windows. When the domed roof was used the walls were higher, for the dome rested on the top of four arches of equal height. Had the two systems been combined, the greater part of the tunnel-vault would have been cut away, and still the difficulties would not have been solved. An attempt was made to obtain the

[1] Continued from page 283, No. 677.

required height for the windows by lengthening the bay and introducing a kind of intermediate shaft, which supported a round arch across the nave, on which rested the crown of the vault. But this was contrary to the principle of vaulting, for vaults have to hold *themselves* up. However, this was a step in the right direction, as it proved, and it turned out to be the key of the solution of the difficulty. The intermediate pier was made into an ordinary pier, so that on plan the nave section became a parallelogram across, instead of lengthwise of the church, two of these parallelograms occupying the space of the former square; then, by the introduction of pointed arches over the spaces thus arranged, the object was gained. Mr. Fergusson has a diagram which expresses this perfectly. I will quote him:

"In spite of all the ingenuity bestowed upon it [this intermediate pier] in Germany, France, and England in the eleventh and beginning of the twelfth centuries, it never produced an entirely satisfactory effect until, at last, the pointed arch came to the rescue. It is easy to see how the pointed arch obviated the difficulty: Supposing the great vault to remain circular, two segments of the same circle, *AB* and *AC*, carry the intersecting vault nearly to the height of the transverse one, or it could be easily carried to the same height as at *D*. When both were pointed, as at *E* and *F*, it was easy to make their relative heights anything the architects chose without either forcing or introducing any disagreeable curves. By this means the compartments of the vaults of the central nave were made the same width as those of the side-aisles, whatever their span might be, and every bay was a complete design in itself."



By this arrangement the arches of the vault *collected* all the weight and conducted it to the four piers, leaving the walls free of weight, and taking away from them every function but that of a screen or "wall-veil," as Mr. Ruskin calls it. To meet the thrust of the vaults, buttresses were built of great strength, but with such ingenuity that the bulk of material was reduced, until every particle not actively engaged in the work of support was removed. It was found that the addition of ornamental features would, from their disposition take the place, as far as the work to be performed was concerned, of some of the massive masonry of the buttresses, and hence pinnacles were introduced, which, by their weight, assisted in the resistance to the outward thrusting of the vaults. As the wall was little more than a screen, there was no limit to the size of the windows. The whole space between the piers could be removed, except for the necessity of a little lateral support to the piers, without weakening the structure. Large windows, then, being easy to obtain, were speedily executed, and colored glass put into them. The colored glass in the windows partly obviated the necessity for color on the walls, but carving, the decoration that had hitherto been painted on the walls, gave a better play of light and shade. As it happened, the lighter the wall-screen was, the better, as it had nothing to do with the support of the roof. The newly-carved wall-space between the sills of the clerestory windows and the top of the nave-arches was wide and heavy, and windows here would be impossible, as the other side of the wall was covered with a roof. But there was no reason why the wall should not be pierced, but rather the contrary. It had been pierced in earlier days to admit light to the nave, but this was not found to be a success artistically or constructionally, and was abandoned, but here piercing was not only desirable, but easily executed, and in effect nothing could have been more beautiful.

In some cases the aisle-roof has been raised and windows cut in the outer wall, but wherever this is the case it gives the appearance of weakness, and entirely removes the repose gained by this belt of arching round the church, with its dark, mysterious background. There is another form of arch which Mr. Ruskin holds in contempt; namely, the four-centred. The reason for its discovery or evolution was not so much *construction* as *ornamentation*, but as it is not *ornament constructed* for its own sake, but rather ornament arising from a desire to decorate the vaults, and in its arrangement principles of construction are observed, it is, perhaps, not fair to condemn it utterly. The effect produced is certainly beautiful, but it heralded the decline of architecture, and, when the form was made use of for windows and doors, a mischief was done that it is impossible not to regret. The "perpendicular" fan-vaulting is the immediate result of discontent and deviation from perfect truth. When the vaulting problem was solved, the execution of it was correct and perfect. It was a grand example of the art: simplicity, truth, and dignity and repose were the visible characteristics, and that which was visible on the surface pervaded the whole structure. But, not satisfied with this, the architects, imbued with notions of change, *forced* the idea, so to speak, and fell into error, a want of truth, and, therefore, not true art. It grieves me personally to recall that a few years ago I was of the opinion that fan-vaulting was the climax of the art and science, and that I have written to that effect, but further study of the matter has given me a different opinion of it, as I have set forth to be the correct state of the case above.

The forms of the ornamentation of architecture are of two kinds, painted and cut, and they are both essential parts of architecture. In the earliest specimens examples of decoration are to be seen, and it stands to reason that it should be so. It is far more natural that buildings should be ornamented in color than that they should be plain. Color, or light and shade, exists in everything, and "architecture" is not architecture without it any more than Nature would be Nature without color. Color need not always be laid on as with the brush. It may be sufficient to use materials of different colors, such as stone and marble in combination or stained-glass, which will throw colored light onto the work. Profuse carving sometimes has been more used than color, but even here there is color in the lights and shades. A perfectly flat surface in Nature is hardly to be found, but anything approximating to it, wherever it occurs, is always relieved from the monotony of one color by light and shade and color.

A green field does not exhibit a uniform green. It is varied with numerous shades, and dotted with simple wild flowers. The dead level of still water reflects on its surface every color around, and the precipitous face of the cliff, however smooth, shows endless shades and colors as the weather has acted on its composition. A bare rock standing out of the earth does not long remain one color. It is soon covered with lichen, which, itself, becomes soil for the plant, and at last even a tree grows upon it. Nature is not satisfied with improving herself, but directly she gets a chance she improves on the works of men. Take a mining district, and note the heaps of waste, "piled mountains high," which have so disfigured and changed the face of the country round, and made it look poverty-stricken, desolate, and God-forsaken: as soon as man has ceased to pile up the rubbish she takes possession, and, wherever possible, some seed takes root, and a few years of her undisputed reign cover the mounds with vegetation. A stone or brick wall soon loses its brand-new appearance, and "tones down," as we say, and is mellowed and made to harmonize with the coloring of Nature. So then love of color is a natural characteristic of man: his surroundings and every association of his life have color in them. Color is, itself, evolutionary. The secondaries evolved from the primaries, the tertiaries from the secondaries, and so on: the chief color of Nature being not a primary, but a secondary. The rock-cut tombs of Egypt were elaborately decorated with hieroglyphics, as I have said, and at every age buildings have been more or less colored.

Between 2000 and 3000 years B. C., the Chaldeans who erected their temples in seven stories and dedicated them to the seven planets, colored each story with the color dedicated to, or symbolic of them: 1. Saturn, black. 2. Jupiter, orange. 3. Mars, red. 4. Sun, yellow. 5. Venus, green. 6. Mercury, blue. 7. Moon, white. Fragments of colored work, plastered walls, etc., have come down to us from very early times, and in the earliest works of Christian architecture may still be seen the faint remains of such coloring on walls, ceilings, pillars, piers and arch-mouldS. The form of the part to be decorated had, of course, a great deal to do with its treatment, and laws must be respected in coloring as in everything else. Plain surfaces need as careful consideration in reference to the whole building as the rounds and hollows of moulded parts; and, if the matter is gone into in detail, it will be found that every color has its proper place. The zigzag is the earliest form of ornamentation, a very primitive one and of very simple origin; a series of nicks with a sharp instrument, along the edge of a projection, is the forerunner of all cut ornament. These nicks or indentations widened and placed close together form the zigzag, which is to be found in the works of all nations. This form proved to be a particular favorite of the Normans, who adhered to it for so long, that it became one of the distinctive features of the style. The single zigzag gave rise to the double zigzag, and that to the lozenge, the varieties of each and their combinations.

But the truest forms of architectural decoration are those whose origins are from Nature, natural plants and foliage, and of these are to be found in early examples such plants and flowers as the lotus, which is a characteristic form of Egyptian ornamentation; lotus and palms belong to Assyrian; almonds, lilies, etc., to Phœnician art. Later we come to the Greeks and find the so-called acanthus leaf, the honeysuckle, lily, holly and others, until, in the perfection of English Gothic, the leaves of all English plants are introduced into the carving, grape-vines, maple, rose, ivy, thorn, burdock, oak and so on. These carvings are very seldom colored, the true undisguised material, the richness of the carving, the deep undercutting making it like lacework, and giving a dark, deep background to throw it up. The color of the stone and the introduction of marble in combination with it, as the yellow sandstone and purple marble at Lincoln, with the light through stained-windows, was sufficient to produce the richest effect.

In the "*Grammar of Ornament*" we find the following notes, which we should do well to remember, as well as others which I shall not quote, on the rules of coloring: "Color is used to assist in the development of form, also to assist light and shade." "These objects are best attained by the use of primary colors on small surfaces, and in small quantities balanced and supported by the secondary and tertiary colors on the large masses." "The primary colors should be used on the upper portions of the objects, and the secondaries and tertiaries on the lower." "In using primary colors on moulded surfaces, we should place blue, which retires on the concave surfaces; yellow, which advances on the convex, and red, the intermediate color on the undersides, separating the colors by white on various planes."

The development of statuary is easily traced, from the wooden idol, representing in the rudest form the imagined attributes of a

wrathful deity, to the exquisite perfection of the statuary of our day copied from Nature. On festal occasions the idol would be covered with colored garments; much as the images in Roman Catholic churches are arrayed now on the feast days of the saints they are intended to represent. Later these garments were replaced by metal beaten into the surface, and then the hollow metal would be the figure; the wooden figure being no longer used. The idea of a figure as a kernel inside gave rise to casting, a thin coat of liquid metal being run over the shaped core; the core taken out the thin metal would hardly stand of itself, and the next operation would be the casting of a figure with a sufficient quantity of metal to stand alone, but still hollow. The cutting of figures in marble soon followed, and the nude human form, as the highest type of beautiful creation, was naturally the example taken for the highest of arts.

In the works of the past, the ancients carried out certain rules to the letter; they were not aware that they were following rules but felt what should be, and they executed it, but not without a struggle: as I have said, in their simplicity they adapted surrounding objects to the ornamentation of their buildings. The art or science of dyeing is much older than painting, and a thorough knowledge of colors existed before painting was much practised. Basing their colors on natural objects, they always spoke of the shades as having reference to particular objects as apple or seagreen, etc. They obtained their greens and many other colors from the vegetable kingdom, and their purples from products of the sea.

Having obtained colors, they soon found forms by means of which they could display them together for the decoration of their buildings. The every-day occupation of sewing has had the greatest influence on the evolution of the art; a seam is a joint in stuffs; an ornamental seam is ornamental construction, and a simple knot of thread is a very important feature; it became a couple of twisted serpents, and is found in this form as a religious symbol in every country. Silk was the foundation of the ornament of the Middle Ages, as wool, flax, linen, etc., were of the ornament of antiquity. The sacred tree-pattern of the Assyrians, derived from plaiting and knitting, has constantly been used for the decoration of walls.

Sewing had an influence on the art, as I have said, and embroidery had a far greater influence; it is the "prototype of all mural decoration." There are two known kinds of ancient embroidery — "*opus plumarium*" and "*opus phrygionum*"; the first is the earliest kind, and consists of colored threads laid over a groundwork, in parallel rows, and this allows of great freedom of treatment; the second is cross-stitch on canvas, the nature of the canvas necessitates the formation of squares, as the stitching followed the pattern of the canvas; and we find examples of decorative work consisting of squares covering large surfaces of walls.

The rules by which the ancients unwittingly worked have been well expressed by various authors, two of whom of very different dates and of very different feelings on the subject of architecture, I will, in conclusion, quote. Vitruvius says: "The perfection of all works depends upon their fitness to answer the end proposed;" and A. W. Pugin: "Every ornament, to deserve that name, must possess an appropriate meaning and be introduced with an intelligent purpose, and on reasonable grounds. The symbolic association of each ornament must be understood and considered, otherwise things beautiful in themselves will be rendered absurd by their application."

R. W. GARNIER-BOUSFIELD, A. R. I. B. A.

BUILDING LAW.

THE RESPONSIBILITY OF AN ARCHITECT — INADEQUATE CHIMNEY FLUES.

THE case of Hubert *v.* Aitkin recently decided in the Court of Common Pleas of New York City and referred to editorially in the *American Architect* for February 9, has, we learn, been set down for re-argument. According to the original decision the architect was to pay one thousand dollars on account of the deficiency of the chimney-flue for an apartment-house, it being claimed and the Court deciding that the chimney was inadequate for the service of the boiler and that the proper consumption of coal could not be secured. The architect is said to have relied upon the judgment of the steam-heating contractor.

There is no novel question of law involved in this case, as the legal principles applicable to such matters are well-understood. The architect in undertaking to design an apartment-house of course holds himself out as capable of drawing the chimney-flues of such dimensions as, taking all the elements of the problem into account, would generally be considered proper and suitable construction for the purpose. He cannot shelter himself behind the opinion of the contractor who does the work, but must be prepared to fortify his case by showing that the construction would meet with the general approval of the profession. The general purpose of the building is to be taken into account, and, as pointed out in the comments of February 9, it certainly would not be appropriate to design for a city apartment-house a chimney such as would be used for a factory where the space occupied by the chimney and the appearance of it would be matters of no consequence.

The only real question in the case is one of fact, viz.: whether the chimney flue in this particular case was such as would commonly be considered in the profession proper for the purpose intended; and the main interest attaching to the case grows out of the natural suspicion that the owner has really got the kind of chimney that he ought to have and is simply trying to cut down the architect's fees.

BACK-BAY RESTRICTIONS — PORCHES AND PORTICOS — THE SPIRITUAL TEMPLE.

THE case of the Spiritual Temple, which has attracted the attention of architects and the public, has at length been decided by the Supreme Court of the Commonwealth of Massachusetts.

As many of our readers are aware, the Spiritual Temple is situated on the corner of Exeter and Newbury Streets in Boston, and was built from plans of Messrs. Hartwell & Richardson in the year 1883.

The controversy arose under the following clause in the deeds from the Commonwealth, under which both parties to the controversy claimed:

"The front wall thereof on Newbury Street shall be set back 22 feet from said Newbury Street, *provided* that steps, windows, porticos, and other usual projections appurtenant to said front wall are to be allowed in the reserved space of twenty-two feet, subject to the following limitations; namely, First, that no projection of any kind (other than door-steps and balustrades connected therewith, and also cornices at the roof of said building) shall be allowed to extend more than five feet from said front wall into said space; and Second, that no projection in the nature of a bay-window, circular or octagon front, with the foundation wall sustaining the same (such foundation wall being a projection of the front wall) will be allowed unless any horizontal section of such projection would fall within the external line of a trapezoid whose base upon the rear line of aforesaid space does not extend seven-tenths of a full front of the building, nor exceeding eighteen feet in any one case, and whose side line makes an angle of forty-five degrees with the base."

At the Northwest corner of the building on Newbury Street a stone porch was built, fifteen feet high, with steep slate roof seven feet high and with solid side walls projecting at right angles to the front wall of the building into the reserved space. The porch was closed in front by an iron gate and projected into the reserved space substantially five feet, though the three lower courses went some three inches beyond the limit.

The action was brought by the Attorney General at the instance of the adjoining owner, whose view and light, in respect to the lower story of his house, were seriously interfered with by the porch.

It was contended by the Commonwealth that the structure in question was technically a porch rather than a portico; that there was no such thing as a portico with closed sides; that the structure in question could not be called a usual projection; and that this particular porch was a projection in the nature of a bay-window. The defendant on the other hand contended that there was technically no difference between porticos and porches; that a porch with closed sides was as much a portico as if it had consisted simply of a roof supported by columns; that projections of this kind were usual in the city of Boston at the time of the execution of the deed; and that such a porch was not a projection in the nature of a bay window, and therefore need not fall within the trapezoid mentioned in the deed.

The Court decided all these questions in favor of the defendant and disregarded the trivial violation of the restrictions in the projection of the lower courses of the porch.

The principal architectural contention in the case, so to speak, was whether the word portico as used in the deeds was intended to include such a structure as this porch with solid sides extended perpendicularly to the main line of the building. The evidence on these points covers one hundred and sixteen printed pages. One builder, one surveyor and two architects testified that such projections were unusual in the city of Boston; and the two architects also gave it as their professional opinion that the structure in question was not a portico by reason of the sides being closed. On the other hand the authority of Ferguson, Viollet-le-Duc, and Parker's "*Glossary*" were invoked to show that in common usage the words portico and porch were interchangeable; and Mr. Hartwell, the architect of the building, and Mr. Henry Van Brunt both testified to the same effect. Upon the question whether such a porch was a "usual" projection, the porches on the following churches in Boston were shown to be undistinguishable in respect to the distinctions made by the witnesses for the plaintiff from the porch on the Spiritual Temple; viz., The Second Church, Baylston Street, the church on Berkeley and Newbury Streets, Ferdinand Street Church, Charles Street Church, Old South, Milk Street, Bowdoin Square Church, church on West Springfield Street, Catholic Church on Washington Street, Swedenborgian Church on Bowdoin Street, School Street Church on Columbus Avenue, church on corner of Marlborough and Berkeley Streets, Peoples' Church on corner of Berkeley Street and Columbus Avenue.

The following were also referred to as differing from the porch in question only in having windows in the sides. Hollis Street Church, Emmanuel Church on Newbury Street, Union Church and Temple Street Church.

The porches of various secular buildings were also referred to, among others those of the Mechanics Fair Building, the Art Club on

Newbury Street, the Institute of Technology, a number of apartment-houses, hotels and private houses, and the Algonquin Club.

The conclusion to be drawn from this case is that although the porch in question is as serious a damage to the adjoining owner as a bay-window of similar shape and height would be, and although probably if the parties had thought of the matter at the time the deeds were executed the erection of such porches would have been prohibited equally with bay-windows, still the deeds did not in terms prohibit the building of a porch with sides perpendicular to the main wall and solid. Wherever, therefore, an architect has this particular form of restriction to deal with — and similar restrictions, we believe, attach to a great part of the land in the Back Bay originally owned by the Commonwealth — he is at liberty to build porches or porticos with closed sides within the reserved space, though not extending more than five feet into it.

SOCIETIES

BOSTON ARCHITECTURAL CLUB.

THE Boston Architectural Club held its fortnightly *conversazione* Thursday evening, March 14. Mr. Ross Turner, who has been in charge of the water-color classes instituted by the Club, made some informal, but very interesting, remarks on the subject of water-color painting, including a brief summary of the history of the art; its application in ancient times; its more modern development; and the characteristics of the English, French, Spanish, Italian and Dutch schools. The most prominent masters of these various schools were compared and discussed, and, in conclusion, some valuable suggestions were made as to selection of studies, materials, subjects, etc. In the open discussion which followed, Mr. Turner gave in detail the steps he would take in making a water-color from nature, using as illustrations two of his paintings in the possession of the Club — the old Endicott house at Salem, and a large interior of a European church — and he also explained how the same ideas could be applied to the water-color compositions which the architect is called upon to make in ordinary professional practice.

The Club is to hold an exhibition of stained-glass and tile-work, beginning March 25. Contributions have been promised from the leading Boston dealers and manufacturers, and, in addition, there will be exposed a collection of sketches of European glass and tile work.

COMMUNICATIONS

BOULDER-WALLS.

March 9, 1889.

To the Editors of the American Architect: —

Dear Sirs, — I am about to put up a building of stone picked up from the surface of the ground of which there is great abundance in the locality and I propose to use this stone for the exterior facing without any tool work whatever and without even as much as tooled margins to the quoins. The door and window openings will be trimmed with brick.

This style of construction has been illustrated by you frequently, but as my masons have not done any of this work I would like to have some hints for their guidance and for my specification.

I should imagine that such a wall is plumbed from the inside only, a minimum and maximum being given, within which the outside face should come, as for instance, 2' 0" and 2' 9".

Is this right? and how much variation may there be between minimum and maximum? Is it necessary to rough-cut beds and joints?

What sizes and variations of sizes looks best for stone?

The building is, say, 45 feet square, walls 18 feet high above ground. Will the lichens or surface vegetation on the stones interfere with the adhesion of the mortar.

If you can favor me with some information in your next issue you will very much oblige,

"Lichen."

[Much depends on the stone. In some places the surface stones are tolerably regular in shape, and make a good wall, while elsewhere they are mere rounded boulders. With boulders the whole strength of the wall is in the mortar, which cannot be too carefully made and used. The wall should be built to two faces to look well, whatever may be the allowable projection of the outside stones beyond the mortar joints. Usually, the outside joints are scraped out at the pointing, to give the proper effect of projection. The best appearance is obtained by mixing large and small stones indiscriminately together, but if there is much difference in size the inequality of settlement will cause cracks, and it is safer to have the stones in the course of approximately the same height. Especially should the use of large stones for the corners be avoided. The corner stone should be long, to tie the angle, but not high, or there will be cracks near them. The brick jambs will do well. In England a wall of this kind sometimes has horizontal courses of brick used to level up a given point, as at the window-sills, with good effect. Lichens would interfere with the adhesion of the mortar. If the mortar is good, the joints need not be dressed, even with rounded stones. Two feet would be rather thin for such a wall, 18 feet high, 30 inches would be much better. Almost any size of stone may be used, avoiding only those which go nearly but not quite, through the wall. — Eds. American Architect.]

NOTES AND CLIPPINGS

An Emancipation Monument. — The colored people of Springfield, Ill., have decided upon the erection of a monument in that city to the memory of Abraham Lincoln, William H. Seward, Charles Sumner, Wendell Phillips, John Brown, and soldiers of the late war. The proposed cost of the monument is about $200,000.00, and the fund will be raised by subscriptions from all the colored lodges and churches throughout the country. The association will secure articles of incorporation. — *Exchange.*

The Flow of Grain. — St. Paul grain men have been vexing their souls over a problem touching a grain-bin and contents. It is this: Given a bin, dump into it, separately, five distinct qualities of wheat; open the spout at the bottom and the query is, which layer of wheat comes out first? The uninitiated say at once, with a few exceptions, "The first layer at the bottom, of course!" W. A. Van Slyke was determined to get at the facts, and watched the bin with his eagle eye very closely the other day, after having caused a layer of barley to be placed on top of several layers of different kinds of wheat. The spout was opened and the barley came rushing out first. — *St. Paul Pioneer Press.*

TRADE SURVEYS

Bank deposits and loans have been increasing this year to unprecedented proportions. At New York last Saturday the deposits were the largest ever known, viz., $442,684,000.00, and loans, $420,406,000.00. Northwestern railroads show an increase in earnings. Southwestern roads do not make a good showing. Roads in the Gulf States are carrying increased quantities of freight and the great trunk lines from Atlantic ports are making better returns as to volume. The Inter-State Committee is threatening severer measures unless the law is lived up to. The managers are gradually being disciplined into closer obedience and the commercial public are much pleased at these evidences of coöperation. The rail-makers expect to sell over 200,000 tons of rails during the month of April at $27.00 to $27.50 East and $30.00 to $31.00 West. A new allotment will be made in a few days. Since March 1, over two thousand miles of road have been projected. The talked-of combination of three Western rail-mills will be voted on May 1. The collapse of the copper syndicate is the subject of congratulation among many who feared further combinations in the event of success in that. Rumors are rife of a tin-plate combine, but such a move would only result in the establishment of the tin-plate industry on this side. Every week develops something new in mining operations in the far West. Within a few days several hundred thousand dollars' worth of machinery have been contracted for and also large orders for machinery, tools and equipments have been placed for irrigating purposes. Land speculations on a large scale are in progress by companies intending to improve and develop land. Speculators anticipate an increase in immigration during the next year or two in the far West and are preparing by railroad building, and irrigation to take advantage of it. The demand for machinery of all kinds, and tools is deserving of special remark. The progress made in machinery, tool and implement manufacture has necessitated a great many changes in plants, large and small, and this in addition to the extraordinary increase in mechanical capacity is sustaining an extraordinary demand. But there is an observable scarcity of work nevertheless in many establishments East, due in part to the starting up of new competitive points farther West and in the South. The aggregate demand is larger than ever a year ago, except perhaps for locomotive engines. Railroad managers are doing more repairing and making their engines last longer and do more work. Trade and business generally is dull. A sudden apathy has overtaken the leading retail markets. Wholesalers have but little as yet to complain of. A marked restriction is setting-in in some branches of the iron trade, although the production of crude iron is but little under one hundred and fifty thousand tons per week and is thirty thousand tons per week over a year ago.

The lumber manufacturers report an increased distribution in nearly all markets. The prospects for a good year are unusually bright, especially in the New England and Middle States. Prices are somewhat higher for yellow pine and poplar. In Chicago, sales of lumber for the first two months this year were 202,000,000 feet, as against 168,000,000 feet same time last year. Stocks on hand March 15 were 535,000,000, as against 481,000,000 a year ago. Gulf State and trans-Mississippi yellow pine manufacturers are sharing each other for control of the Northern and Northwestern markets, and, in consequence, prices are on the down-grade in those markets. The Northeastern supply is practically under the control of an organization, and prices are pointing upward. Extraordinary lumber developments are in progress on the Pacific Coast. The coal trade is sluggish because of the possibility of lower prices, especially in anthracite. The Atlantic soft-coal interests have effected a combination for the season. Western mining regions are averaging three-quarters output. Coke-oven builders are hurrying forward work on new plants. About one oven in thirteen in the Connelsville region is now idle. All the brick-makers will soon be at work. Machinery-makers report large deliveries of machinery, especially in the South. The export of plate is increasing rapidly, most of the increase going to Australia and New Zealand. The production of coal last year is figured up at 145,303,744 tons, as against 129,975,557 tons in 1887; increased value, $26,000,000. Of this Pennsylvania produced last year 76,078,000 tons, or over one-half; Rhode Island produced 6,500 tons, Nebraska 1,500 tons, and Idaho 600 tons, all net. Only one ton out of every thirty-eight tons of anthracite is exported. From nearly all large cities come rather favorable reports concerning building operations. Architects are not rushed with work, but the prospects are good for the season. The erection of small houses will exceed last year's record if opinions are reliable. A great deal of work is to be pushed in small towns and cities; relatively more, so far as accounts go, than in larger cities. A disposition is manifested to get away from cities by many manufacturers operating with necessarily limited capital. Textile manufacturers are slowly increasing their output, especially in cotton and mixed goods. Boot and shoe statistics show a slight increase as against last year. Electrical machinery-makers are very much crowded. Hardware manufacturers are slackening production. Nail-makers are annoyed with large stocks. Bar iron-makers report business very depressed. The key-note of the situation is delay.

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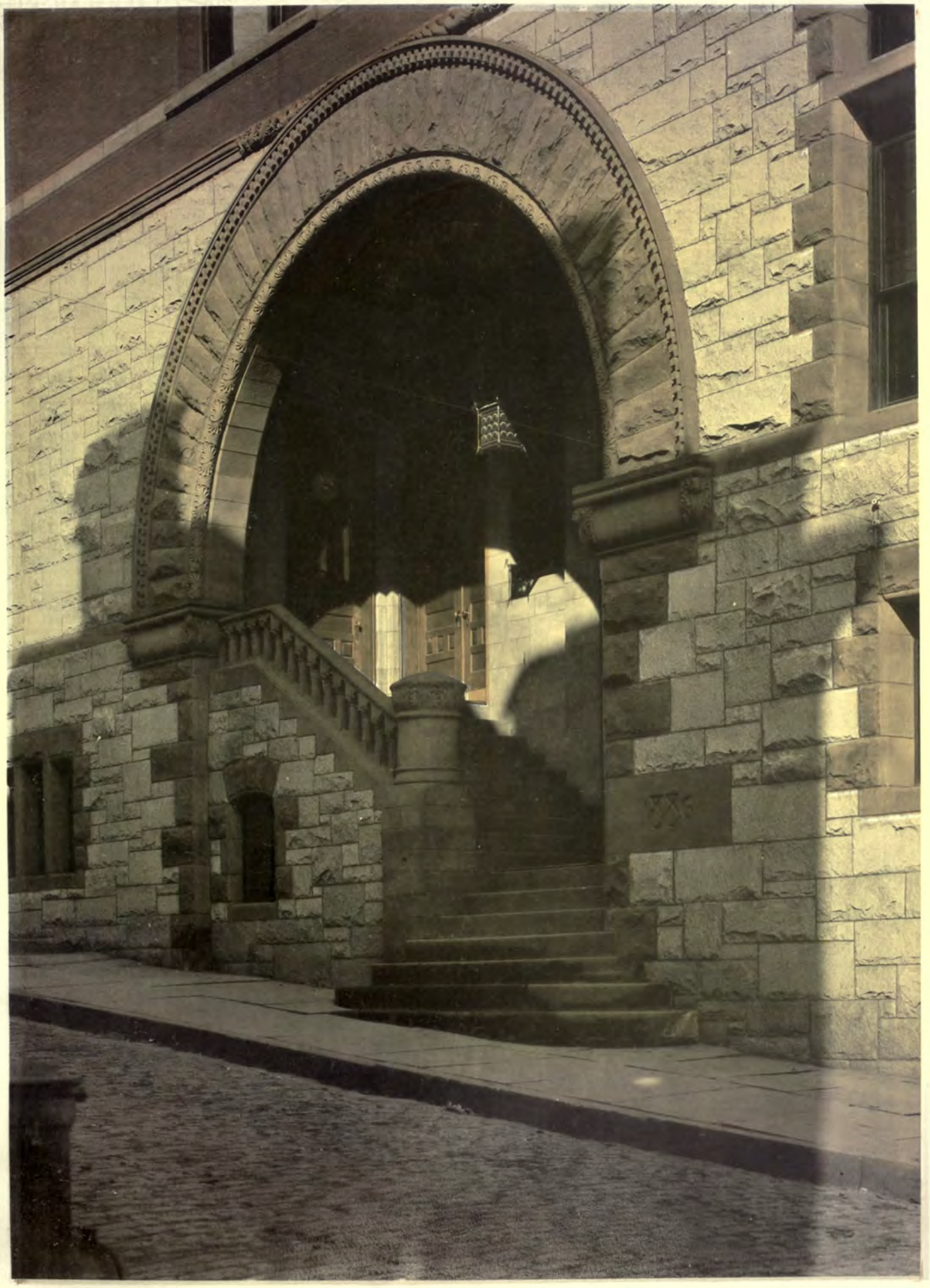

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 692.

MARCH 30, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE public is to be congratulated on the selection of Mr. J. H. Windrim, of Philadelphia, as the new Supervising Architect of the Treasury Department. Mr. Windrim has been long and favorably known in the profession, and the appointment will meet with general commendation among architects. Whether Mr. Windrim himself is to be congratulated, we are not so sure. If it is a necessary part of an American architect's lot to be so moderately favored by fortune that the pittance offered by the Government for such service can attract men so popular and distinguished as Mr. Windrim, the sooner the profession is emancipated the better. There is no public officer in the United States from whom so much technical skill, administrative ability and honesty are expected as from the Supervising Architect. Yet his technical knowledge, which costs him as much to acquire as that of any lawyer, is repaid by a yearly salary which would not be accepted by a Government counsel as a fee for two days' attendance in court, while his care in managing a corps of five hundred professional subordinates, or in regulating and accounting for the expenditure of many millions of dollars a year, either of which would bring a salary of at least twenty thousand dollars a year to the president or treasurer of a private corporation, are furnished gratis.

THE subject of official architecture is one of great importance to the profession, and such influence as architects of repute can exert to have public service of this kind, if it cannot be provided for as it is in other civilized countries, at least put into the hands of men who command the respect of the profession, is well applied. Next to the Supervising Architect of the Treasury, the official architect in this country who controls the expenditure of the most money is the City Architect of Boston, and if, as is reported, a new appointment is to be made in this case, the members of the profession in Massachusetts owe to their fellow-citizens the duty of pointing out, as no one else can, the errors that have been made in the administration of this part of the public service, and the best way to avoid them in future. It is notorious enough that the management of the public architecture in Boston has at times been a disgrace to the city. Not only, as we mentioned a few weeks ago, have buildings erected under the City Architect cost in some cases nearly or quite twice as much as similar buildings erected in neighboring towns, but evidence has been produced, showing that, so far from securing structures of the best class by this lavish expenditure of money, the city has been defrauded by the undetected, or unopposed, substitution of inferior materials and workmanship for those required by the contracts between the city and certain individuals, whose right to such favors remains to be explained. It is fair to say that in plan and design the Boston public buildings have generally been good, and we do not wish to suggest that the official architects did not try to do their duty in supervising their erection, but the fact remains that the design and supervision have cost as much in official hands as they would have in those of a private architect, while the city has lost the benefit of the responsibility for mistakes to which a private architect would be held, and has suffered immensely through the feebleness of the supervision which an over-driven official, necessarily so little familiar with the details of the numberless designs pushed through his office as to forget what his plans and specifications called for, can give.

IF it is necessary to have professional public officers of this kind at all, about which we are by no means sure, it seems to us that in the assignment of the duties which they are to perform a good lesson might be learned from the example of the other professional officers attached to the United States Government. In every other Department or Bureau the chief official devotes his time, not to devising schemes for the public benefit out of his own head, but to examining those proposed by others, digesting and comparing them, and, if he sees fit, recommending them for execution, and seeing that they are properly carried out. The Attorney-General finds himself much better occupied in examining and criticising the briefs of the various Government counsel than in writing them himself; the Commissioner of Education can do more good by engaging specialists to write on topics of which he perceives the importance, and by disseminating their essays among the public, than by trying to write them all himself; and in the same way, an official architect in a great city like Boston can, we think, be far more useful in editing, so to speak, the designs for new buildings prepared by different men, who have leisure and skill enough to study them properly, and in seeing that they are carried out exactly according to contract, than in trying to make them, or direct the making of them, himself. In a place like Boston, long experience has shown that certain peculiarities in school-house design, for example, are suited to the character of the population, and that, perhaps, it is desirable to fulfil certain conditions of drainage, heating or ventilation. These matters may not be known to architects in general, but by providing for the review of designs for city work by a man familiar with them, all the advantages to be derived from the skill and ingenuity of the ablest men in the profession, working at their best, may be secured in connection with whatever conformity with local tradition may be advisable. In the offices of the Inspectors of Buildings in our large cities a very similar set of traditions has grown up in regard to matters left discretionary with the Inspectors. Without any interference with architects' freedom of design, within the limits of the law the influence of the Inspectors, in examining and passing upon plans, has tended to promote a uniformity of construction which has, on the whole been advantageous to the public, and to the art of building, while it has greatly facilitated the most important part of their own works, the prevention of gross mistakes in carrying out construction.

A PLAN for a gigantic music-hall is being discussed in New York, and a plot of ground has already been secured on the corner of Seventh Avenue and Fifty-seventh Street, comprising nearly twenty-three thousand square feet. On this is to be erected a structure as perfect as study of the best existing music-halls in the world can make it, and capable of accommodating three or four thousand people. Nearly a million dollars has been promised, and there can hardly be a doubt that the plan will be carried out. New York certainly needs a good music-hall. Steinway's and Chickering's, although good, are too small for the audiences which would often like to occupy them, and the theatres are too expensively built for general use as music-halls, and are not very well adapted to that purpose. The situation of the proposed building is very central, and it seems likely to prove a good investment for its owners.

THE Board of Education of Wheeling, West Virginia, recently advertised for plans for a new school-house, and, we are glad to say, by so doing incited Mr. O. S. Philpott, an architect of the city, to write a letter to the *Daily Intelligencer*, setting forth the unfairness of expecting architects to furnish for nothing the various plans that the Board wanted. If it

was desirable to compare a number of different plans, he said, why should not the Board pay those who could make them for their trouble in doing so? To offer architects only the chance of employment was, he thought, insulting to them, as putting them on a level with gamblers, and he advised all respectable architects to refrain from having anything to do with the affair. We are much inclined to think that they will follow his advice, and that the Board will have, as is usual in such contests, nothing but a lot of crude, ignorant plans presented to them to make a selection from. Of course, they will not know, unless they have engaged an accomplished architect to advise them, that the designs are crude and ignorant, and the authors of them will fill the air with praises of their perfections; but this will not alter the facts of the case, and the result will be, we fear, that one more specimen will be added to the crowd of badly planned, badly built, badly ventilated, badly heated, ugly and vulgar structures in which our American children lose their eyesight, their health and their morals, as a sacrifice to the vanity of people in power, too ignorant to know that there is such a thing as scientific school-building, too conceited to listen to any one who knows more about it than themselves, and too mean to follow his advice, if by chance it should be forced upon their attention.

THE examination of the Washington Aqueduct shows that the work has been shamefully done, the brick lining being hardly backed up at all, so that in many places a man can walk a long distance between the rock-cutting and the brick-lining. It is estimated that it will cost five hundred and fifty thousand dollars to make it fit for service, and meanwhile, as it would be dangerous to admit the water to it, a temporary pipe is to be laid on the surface of the ground, to convey the water where it is needed. As usual, the newspapers have fallen foul of Major Lydecker, under whose supervision the work was done, as the principal culprit, instead of the contractor who impudently violated his contract, and pocketed the money; on the principle, which is as old as humanity, that the man who succeeds in what he undertakes, even if that is a gigantic robbery, is to be envied and praised, while the unsuccessful man, even if he undertook nothing more than to try to catch the thief, is saddled, not only with the burden of his own fault, but with the sins of the thief whom he failed to catch. In accordance with this view, Major Lydecker is to be tried by court-martial, on a charge which seems to be, in substance, that he believed what the contractor told him, instead of finding out the truth for himself. What is the penalty for this crime in the military code we do not know, but when the court-martial gets through with the Major, we hope it will turn its attention to the contractor. Even though he may not be amenable to military justice, the opportunity for establishing the difference between actual swindling and the simple inability to detect the fraud, is too good a one to be lost.

SOME time ago we had occasion to comment upon a scheme for building a balloon, or rather air-ship, of steel, not inflated with hydrogen, but made buoyant by being exhausted of air. To aid in the undertaking, Congress was asked to appropriate a hundred and fifty thousand dollars, and we expressed the idea that, while it was very desirable that the solution of this great problem should be generously aided with public money, the proposed air-ship, as described in the daily papers, presented so small a margin of ascensional power, in comparison with its own bulk and weight, that there might be danger that this small margin would be absorbed by unforeseen conditions, atmospheric or otherwise, and the craft would be reduced to a mere useless dead-weight. Since then we have obtained more accurate information in regard to the plans and calculations of the inventor, and the difficulties certainly seem less, and the chances of success greater, than the first description would have led one to suppose. The floating cylinder is to be of rolled steel, one-forty-fourth of an inch in thickness, braced against collapse by internal ribs in a way which has been carefully studied out, and is ascertained to give a resistance to external pressure twice as great as will be required. The weight of the cylinder, which, with its conical ends, is about seven hundred and fifty feet long, is something like one hundred and fifty tons, and its displacement, supposing only three-fourths of the air in it to be exhausted, will be about two hundred and seventy-six tons, leaving a force available for ascending of one hundred and twenty-six tons. From this, to obtain the net ascensional force available for lifting passengers or freight, must be deducted the weight of the car and of the propelling machinery to be placed upon it. Here, as it seems from the particulars we now possess, was the principal point in which our previous calculations, or rather, estimates, were at fault. Learning that the force was to be derived from accumulated electricity, operating through electric-motors upon air-pumps, we estimated the weight of such electric accumulators, motors and air-pumps as are in common use for supplying the one hundred horse-power mentioned as the amount to be provided, and found that the total, added to a moderate allowance for the weight of the car, would nearly absorb the available balance of ascensional force, leaving what we thought too small a margin for contingencies. It seems now, however, that instead of the enormously heavy electric-accumulators that we are familiar with, Dr. de Bausset, the inventor of the apparatus, has devised something quite different, which will furnish far more power, with a given weight of material, than the lead plates in ordinary use. The pumps, moreover, are to be specially designed, and constructed of aluminium and steel, so as to reduce the weight to a minimum, and, as we suggested at the time would be desirable, the principle of the gas-engine has been adopted in a device for supplementing the force of the electric-current. By these great economies the weight of apparatus has been so reduced as to leave a balance of ascensional force at the sea-level available for lifting passengers and freight of seventy-five tons. This certainly gives a reasonable allowance for contingencies, and, if a craft of this kind can be built for one hundred and fifty thousand dollars, as is estimated, capable of carrying anything like seventy-five tons of mail-matter or a thousand passengers, at the rate of a hundred miles an hour about the world, the experiment is well worth trying at the public expense; or, if that is objectionable, at the expense of persons who may be willing to risk a little money for the prospect of a great profit if the experiment should result successfully.

THE consequences of a successful issue to the undertaking would be so momentous that they can with difficulty be realized. The first result would unquestionably be to put an end to wars. To show how hopeless any military operations would be in a country defended by such weapons, we will suppose that Prince Bismarck, after waiting until Dr. de Bausset has, unknown to him, completed a few of his air-ships, carries out the intention which a good many people in this country attribute to him, of picking a quarrel with us on the pretext of a dispute about Samoa. War is declared suddenly, after the German manner, and the military trains which are said to stand ready packed, with the horses at hand for harnessing, in the German arsenals, are set in motion. The transports, which lie equipped for sea, are filled with men from the nearest garrison, and in a few hours an immense force is on its way to invade America. About half-way across the Atlantic the fleet is met by one or two de Bausset air-ships, which sail about, far out of reach of shot, and, taking position in a leisurely manner, drop a five-hundred-pound shell filled with explosive gelatine into the funnel of each, and, having thus annihilated the expedition, proceed to Berlin to treat the remaining portion of the hostile army in the same way. Of course, it might be that the Germans would have the air-ships first, and the war would be brought to a conclusion by the unconditional surrender of all the principal cities in the United States, under the persuasion of a dynamite-shell held suspended over each; but it would be so easy to turn the tables at a moment's notice that, after a few towns had been mutually blown up, the quarrel would be terminated by common consent. In regard to passengers, the air-ships, if they proved practicable at all, would offer such immense advantages in point of safety, speed and comfort, that they would soon supersede all other conveyances for travelling long distances. It seems to us that the proposed speed of one hundred miles an hour would in practice be greatly exceeded. There would be no such obstacles to fast sailing in the air as are met with in ocean-travelling, in the shape of waves, fogs, and danger of collision. By keeping ships on the outward passage in the lower strata of the atmosphere, and the inward-bound ones in the upper strata, serious collisions would be out of the question; and, provided the speed could be made to exceed that of the air-currents as much as that of steamships exceeds that of the ocean-currents, it is difficult to see what danger would remain of which travellers by well-built and well-managed air-ships need be afraid.

BUILDERS' HARDWARE.[1]—XXII.

VESTIBULE-LATCHES.

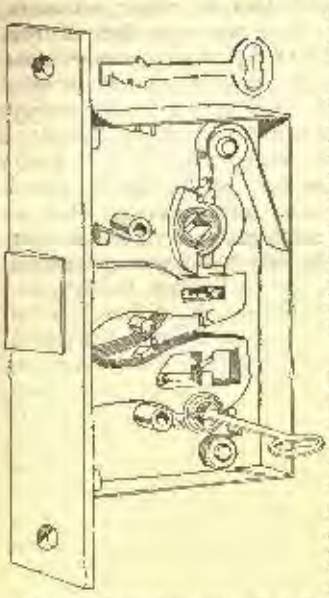


Fig. 328. Front-Door Lock. P. & F. Corbin.

THESE are always sold in sets, with a front-door lock, and the levers are so arranged that the same latch-key will open both, the vestibule-lock having no dead-bolt. But, more generally speaking, a vestibule-latch may be considered as any spring-lock having no dead-bolt. When used for a vestibule-door the latch should have swivel-spindles and levers to lock the outside-knob.

Figure 328 is a pattern which P. & F. Corbin list as a front-door lock, but which seems to be more properly a vestibule-latch. The key lifts the levers and moves a plate on which are two posts *A* and *B*, one of which must pass the gatings before the other can reach the shoulder on the latch-bolt *C*, and force it back.

Figure 329 is the vestibule-latch sold with the front-door lock represented by Figure 327.

Figure 330 is a Standard knob-latch manufactured by the Yale & Towne Company, which is not, properly speaking, a vestibule-latch, but which is worthy of consideration in this connection. It is provided with triple-springs, thus permitting a very easy action on the part of the striker while giving all

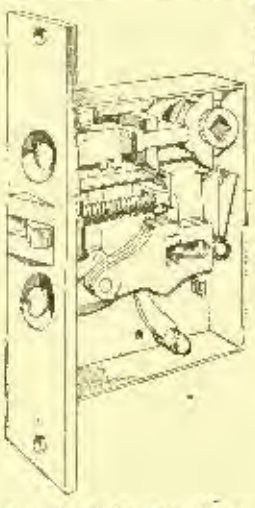


Fig. 329. Vestibule-Latch. Enoch Robinson.

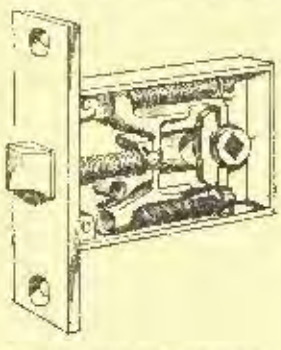


Fig. 330. Standard Knob-Latch. Yale & Towne Mfg. Co.

necessary strength to resist the turn of the knob. This can be adjusted to either right or left hand doors.

HOTEL-LOCKS.

Hotel-locks are usually made to order, and master-keyed in sets. In a large hotel all the locks on a floor can be opened with one key. In smaller buildings all the room-locks are master-keyed in a single series. The protection afforded by locks which are master-keyed is, of course, less than it would otherwise be, as a master-keyed lock can very easily be picked if the principle of master-keying is understood, and in most cases master-keying benefits no one but the hotel-keeper. Except with the "Yale" and the "Hopkins & Dickinson" cylinder-locks, there has not yet been devised a really satisfactory system of master-keying. The two exceptions will be described in a subsequent chapter.

The simplest and also the cheapest method of master-keying is illustrated by one of "Corbin's" locks, Figure 331. The gating on the one lever is made so wide as to admit of fifty different positions, in any one of which the bolt-post could pass. The room-key raises the lever so as just to clear the top of the gating, and the master-key allows the post to clear the bottom of the gatings. A bent wire would serve quite as well for opening the lock as either of the keys. Fortunately for occupants where such locks are used, it is customary to fit hotel-locks with a small bolt, worked from within. Figure 332 is much better. The levers are exactly like those of any ordinary lock, except that there is a shoulder *A* at the back of each. Beneath the bolt-tail is a fourth lever, with an arm on

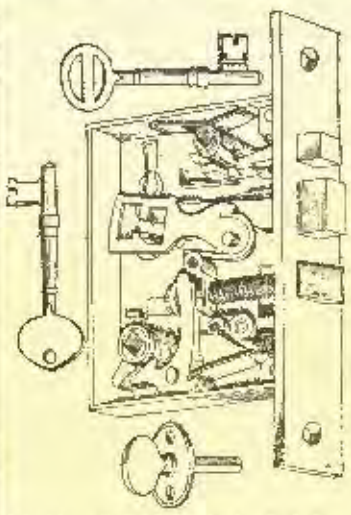


Fig. 331. Master-keyed Lock. P. & F. Corbin.

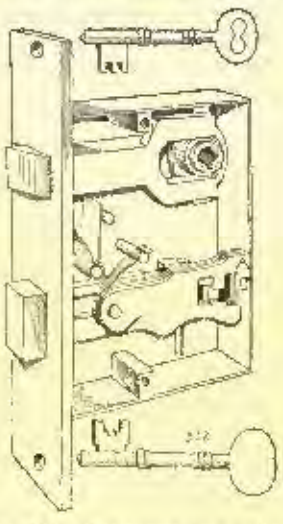


Fig. 332. Master-keyed Lock. Hopkins & Dickinson Mfg. Co.

it, rising so as to catch under the shoulders *A*. This lever is protected by a ward about the key-hole. The room-key lifts

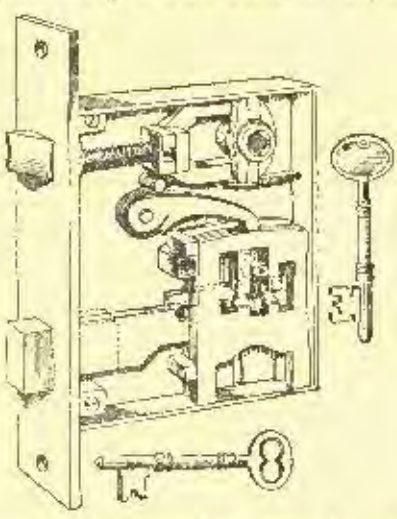


Fig. 333. Master-keyed Lock. Hopkins & Dickinson Mfg. Co.

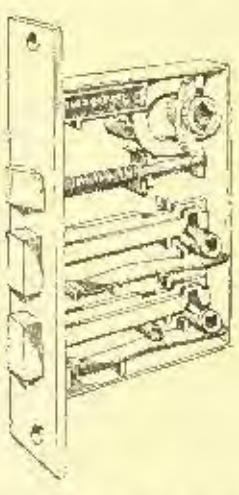


Fig. 334. Hotel-Lock. Hopkins & Dickinson Mfg. Co.

the levers and shoots the bolt without disturbing the fourth lever. The master-key lifts the fourth lever without touching the others, the shoulders being so sized that the master-key lever will bring the gatings on the locking-levers into line.

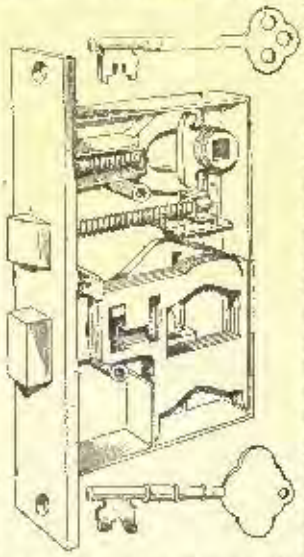


Fig. 335. Standard Hotel-Lock. Yale & Towne Mfg. Co.

Figure 333 shows another form of master-keyed lock by Hopkins & Dickinson. In this instance the regular key and the master-key work from either side of the lock in the same key-hole on the same tumblers and bolts. Still, each has a different set of tumbler-rackings and a different post in the bolt. When the master-key is used the bolt-post for the regular key is thrown down by a patent device, and another post brought up in the second rackings of the tumblers. When the master-key is removed the lock is set in use for the regular key. It is claimed that 1,200 of these locks can be made, all different, each lock with a key of its own which will fit no other, and with master-key to pass all. This is a rather expensive lock, however, and on that account is not used a great deal. The idea is an exceedingly ingenious one.

[1] Continued from page 124, No. 800.

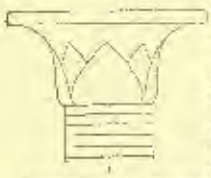
Figure 334 shows a Hopkins & Dickinson lock, or rather bolt, used for hotel and office doors between connecting rooms. This is intended to be used when it is desired to have the door definitely locked from either side, so that it cannot be unlocked from the other side, and, accordingly, the handles which operate the bolts are placed on opposite sides of the doors. The same company also manufactures a hotel-lock which is so arranged that the locking-bolt can be operated from the inside by a turn-button, instead of a key. When the door is locked from the outside it can at any time be opened from within by turning the button, so that it is impossible for an occupant to be locked in the room.

Figure 335 shows the construction of a Yale "Standard" hotel-lock. In this case the master-keying is provided for by a second set of rackings cut in the levers, so that almost any number of variations can be had in a given series of locks, the variation being entirely in the lower set of rackings. The room-key lifts the levers exactly the same distance as the master-key, but as the proportion between the lengths of the bits, and the height of the lever bellies above the lower key-hole is different in each lock, it is easily understood why no two locks can be opened by the same room-key.

[To be continued.]

THE LOTUS IN ANCIENT ART.[1]—III.

THE LOTUS AND THE PAPYRUS; THE LOTUS AND THE ROSETTE.

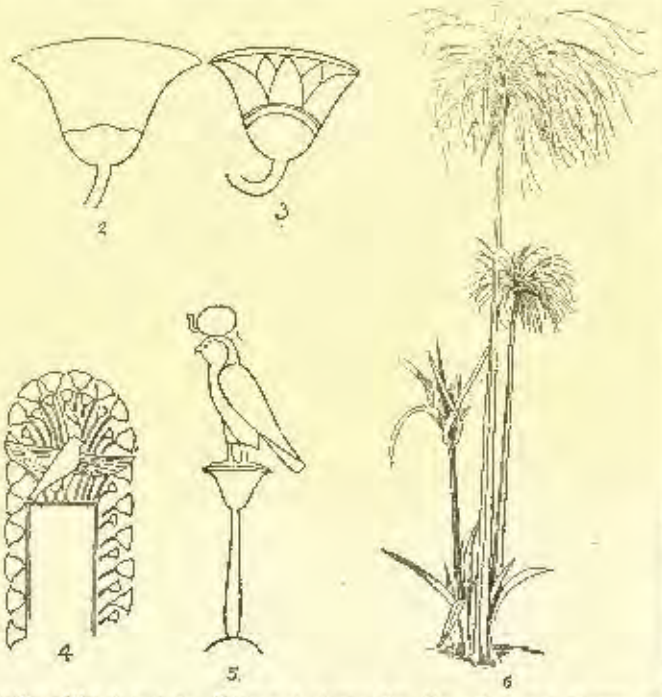


WHILE observations tending to show that the rosette in ancient art (from which it has descended to be part of the stock-in-trade of all modern decoration) was originally an Egyptian lotus motive, and not an Assyrian ornament, as hitherto supposed, may be assisted by some preliminary notes on the subject of the papyrus.

According to generally current views, the papyrus and the lotus shared the honors in Egyptian decoration. Among authorities in decorative art, Owen Jones, and among Egyptologists, Mariette, have been especially prominent in attributing a papyriform origin to the campaniform capital (1).

Perrot, who does not accept this theory of the campaniform capital in his "*History of Egyptian Art*," speaks, notwithstanding, of the form (2) as a papyrus. This is the prevalent view of it, but only because attention has not been called to the subject.

The form 2 is really only the form 3 in conventional outline. The demonstration on this head is conclusive when we observe represen-

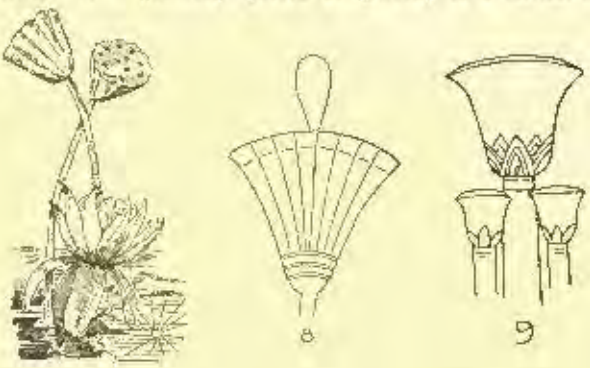


tations like 4 and 5. Figure 4 shows the Egyptian god Horus, in his guise of hawk, standing on a stèle surrounded by lotus flowers. Figure 5 shows the same god standing on a stèle having the campaniform capital. The Horus hawk in this cut supports the solar disk, an illustration of the association of Horus with the sun previously noted. In my first paper on the Ionic capital the association of Horus with the lotus has been explained, and it is conclusive for the forms in question.

[1] Continued from No. 689, page 118.

The confusion of the lotus with the papyrus has been assisted by the fact that the papyrus is extinct in Egypt, and, consequently, unknown to the current personal observation of the Egyptologists. As illustrated by the cut herewith (6), borrowed from Perrot's "*History of Egyptian Art*," the light, feathery nature of the plant has little in it to suggest the solid form of an architectural capital, and although it might be urged that the lotus flower itself has no especially solid outline or construction, we have in this case the religious significance of the flower as explanation, which is wanting in the case of the papyrus. Besides, there are countless cases in which the lotus flower is directly represented in architectural use, and no such case can be proved for the papyrus. The umbelliferous outline of the head of the plant does certainly correspond to the outline of the campaniform capital. Undoubtedly the Egyptians might have taken a suggestion from its outline. As a matter-of-fact, they did not.

The papyrus is grown as a curiosity in some private gardens in Cairo, but it does not in this way come under the observation of travellers. It is generally quoted as growing in a stream near



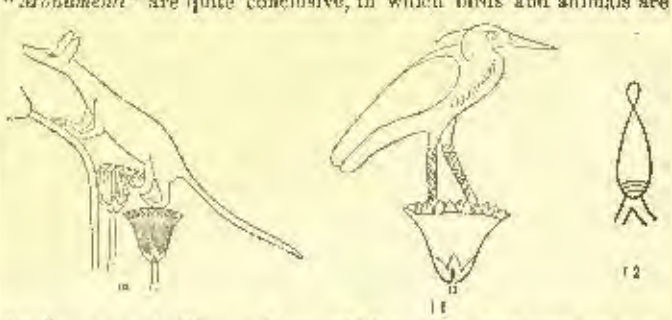
Syracuse, in Sicily, and as otherwise not easily accessible to observation in its wild state. The plant has been naturalized in America. It is cultivated by Mr. Stuntevant, the florist of Bordentown, N. J., whose lotus ponds have already been mentioned, and has thus been transferred to many of the park fountain-basins in New York City.

In considering the confusion which has arisen concerning the use of the papyrus and the lotus in Egyptian art, it is to be remarked that the rose-colored lotus is also extinct in Egypt. Consequently, Egyptologists are not familiar by personal observation with the peculiar seed-pod represented at 7. (Also shown in the first paper on the Ionic capital.)

The form 8, which is taken from the ceiling border of an Egyptian tomb, illustrated by Prisse d'Avennes, is not far removed in outline from Figure 2. The ridged, perpendicular lines of the natural seed-pod give the clue, however, to the decorative form (which supports an inverted bud).

Certain Egyptian capitals of the shape illustrated at 9 appear to be derived from the rose-lotus seed-pod, rather than to be modifications of the conventional campaniform lotus flower.

As regards the papyrus, certain representations in Rosellini's "*Monumenti*" are quite conclusive, in which birds and animals are



standing on umbelliferous forms which are positively seed-pods of the lotus, as neither the flower itself nor the head of the papyrus plant could possibly give the amount of support required and indicated.

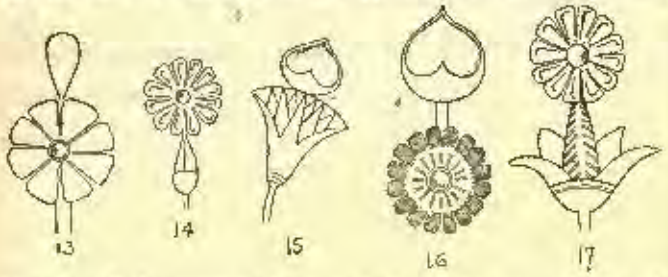
In 11 the pointed projections at the top of the pod indicate the seeds which, in nature, project slightly from the small, cup-like recesses which contain them. A modified representation of the same appearance is seen at 10.

THE LOTUS AND THE ROSETTE.

There is no apparent connection between the subject of the rosette and that just considered. The only question is one of association, by which the significance of the rosette is partly determined. It is important to eliminate from Egyptian decoration all misconceptions on the subject of the papyrus, as the association of the rosette with forms of papyrus would not be significant. The great multitude of associations with the lotus form become clearer when the outlines of the seed-pod of the rose-lotus and the conventional campaniform lotus motive are recognized distinctly.

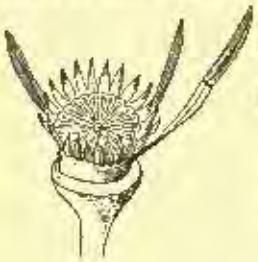
As regards the rosette, we may observe in the first place the constant appearance in Egyptian decoration of different details of the lotus in conventional combination. For instance, in the ceiling-borders illustrated by Prisse d'Avennes, we may add to No. 8, in which the seed-pod of the rose-lotus supports an inverted lotus bud, another case in which one bud erect supports another inverted (12). When we add the cases in which a rosette supports the bud (13), and in which a bud supports a rosette (14), the question naturally arises: Are these also cases of lotus association?

From the same decorations, we now add the cases in which a lotus flower supports a lotus leaf, and the question again presents itself: Are the cases in which a rosette supports a leaf also cases of lotus



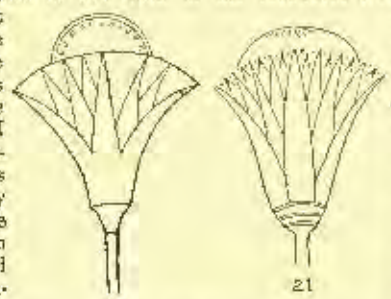
association? Such associations, to which we may now add those in which the lotus flower itself supports a rosette (17), become comprehensible when we examine the seed-pods of the white and blue lotus. The cuts herewith, 18 and 19, are taken from the botany plates of the "*Description de l'Egypte.*"

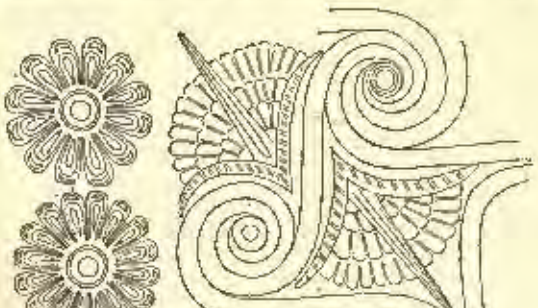
Egyptian design constantly evades representations in perspective by the union of objects seen at the same time, or in the same combination at once in elevation and in plan. We have, therefore, no difficulty in understanding a representation of the top of the seed-pod or ovary as supported by the flower.



Comparison of 18 and 19 with 7 shows that the seed-pod of the rose-lotus has not the rayed top; and in certain decorative combinations, of which 20 is an example, we have probably a section of the top of the seed-pod of the rose-lotus rising above the flower. Figure 21 appears to show a similar combination, possibly the roundel top of the pod rising above the flower. In these cases, the brilliant yellow color of the curved sections correspond to the color of the seed-pod of the rose-lotus.

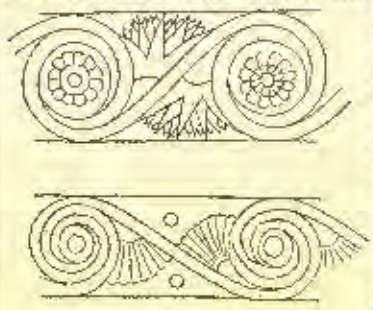
In a preceding paper the size of the seeds of the rose-lotus has been mentioned as about that of a small filbert. The taste is agreeable, not unlike that of a chestnut but not as raw. During a visit to the lily-ponds at Bordentown, I was advised by the nurseryman in charge that the boys of New Jersey had already discovered the virtues of the new edible, which is grown in sufficient quantities in a pond near the town to make excursions for this delicacy an object. We know from Herodotus and other ancient authors that the Egyptians used the seeds for food and made bread of them. The same use was made of the seeds of the white and blue lotus which are



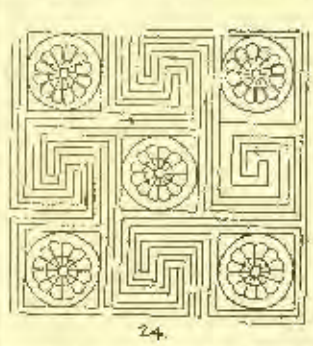


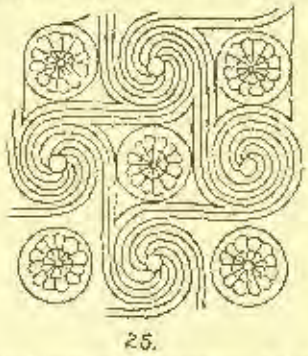
contained inside the ovaries and have the size of small grains. It appears even that the lotus was sowed as a food crop. All this would make it extremely natural that the Egyptians should have found a decorative motive in the rosette form of the stigmas of the white and blue lotus.

The most curious oversight of modern archæology is its prejudice that the rosette is a distinctive Assyrian form and that the Greek rosette is hence derived. Authors like Longperier[1] and Charles Chipiez[2] have attributed the decoration of certain vases figured at Karnak to a foreign influence on the ground that they are ornamented with rosettes, in absolute oblivion of the fact that the rosette is a constantly recurring motive in Egyptian tomb decorations which antedate the earliest known instances of a Babylonian or Assyrian rosette by at least seven hundred years. In that most recent history of ancient art which is supposed to summarize all accepted results up to date M. Perrot treats the rosette off-hand as a distinctively Assyrian ornament. German authorities on Greek vases invariably refer a rosette decoration to Assyrian influence. When the ceiling fresco at Orchomenos was recently discovered by Schliemann, Professor Sayce immediately attributed the rosettes to a Babylonian influence, although the decoration has a thoroughly Egyptian character.

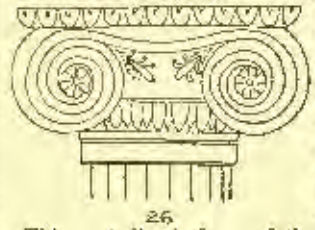


The decoration at Orchomenos (undoubtedly of Egyptian style) dating from the prehistoric Greek period (time of the Mycenæ





jewelry) is illustrated at 22 as a typical case of the constant union in Egyptian decoration of the lotus, the rosette and the spiral. Nos. 23, 24, 25, are illustrations of the frequent appearance of the rosette in Egyptian decoration. All are details from tombs of the eighteenth and nineteenth dynasties; i. e., dating back to a period beginning about 1800 B. C. The earliest instance of an Assyrian or Babylonian rosette appears on the dress of a Babylonian king of the twelfth century B. C. There are no remains of Assyrian ornamental art earlier than the ninth century B. C. Most of the Assyrian rosette decorations belong to the eighth and seventh centuries.



This prejudice in favor of the distinctively Assyrian character of an ornament which is so common in Egypt and which appears there in constant use so much earlier than it appears at all in Assyria can only be explained as follows: In publications of Assyrian monuments the reliefs have been the most constantly illustrated objects and it is on these reliefs that the rosettes constantly appear. In Egyptian publications the architectural reliefs have also been the most generally illustrated objects and in Egyptian relief the rosette is almost unknown. It is in the Egyptian tomb-paintings that the rosette is a constant form and these had not been abundantly illustrated until the publication of Prisse d'Avennes in 1879. In the earlier folios of Champollion and Rosellini there are some details by which they are illustrated but they were published at a time when the high antiquity of the eighteenth dynasty was not an axiom of Egyptian chronology. Perhaps the most important explanation is that the history of ancient ornamental art antedating the period of the Greeks has not yet been scientifically founded.

In defining the rosette to be a lotus motive we may return for a moment to the Ionic capital, noticing the appearance of the rosettes within the lotus volutes in the capitals of the Erechtheium and in the capital from Selinus illustrated at 28 (the demonstration still to be offered for the lotiform derivation of the "egg-and-dart" moulding will considerably assist the general argument as a cumulative point). The appearance of rosettes within the volutes of the Persian-Ionic scrolls (capitals of Persepolis and Susa) is another case in point. We are now prepared to understand the rosettes figured on the Cypriote lotuses, as in Figure 27. Another case in point is

[1] In "*Musée Napoleon III.*"
[2] In "*Histoire des Ordres Grecs.*"

shown at 28, the detail of a Cypriote vase in the Lawrence-Cesnola collection in England.

The relations thus established between the rosette form and the ovary stigmas of the white and blue lotus do not militate against the palpable cases in which a rosette form is derived from a concentrically arranged series of rayed lotus petals, a view of the flower itself seen in plan as it were. These are easily distinguished from the pictures of the ovary stigmas by the pointed aspect of the petals. The angled terminations of the blue lotus stigma are blunter. These last are most clearly represented among the gold ornaments found by Dr. Schliemann at Mycenæ.

In preceding papers note has been taken of interpretations offered by MM. Colonna-Ceccaldi and Dieulafoy of the Ionic. According to the matter herewith presented their views on the subject of the ovary, already made sufficiently improbable, would appear to be permanently set aside. Colonna-Ceccaldi conceived the ovary to be represented by a triangle which was really a calyx-leaf. Dieulafoy conceived the ovary to be represented by a form which was really a bud inverted.

As regards the rosette in Assyrian decoration it is to be observed that it generally appears in association with lotus motives which are admitted to be borrowed from Egypt. Its appearance in early Greek vase decoration is invariably with lotus patterns and lotus derivatives.

Wm. H. Goodyear.

[To be continued.]

ILLUSTRATIONS.

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

RAILROAD STATION, BATTLE CREEK, MICH. MESSRS. ROGERS & MACFARLANE, ARCHITECTS, DETROIT, MICH.

[Gelatine Print, issued only with the Imperial Edition.]

THE BRYN MAWR SCHOOL, BALTIMORE, MD. MR. HENRY RUTGERS MARSHALL, ARCHITECT, NEW YORK, N. Y.

THE building for the Bryn Mawr School for Girls which is now being erected on Cathedral Street is intended to accommodate 150 day scholars. It will be 90 feet front and 70 feet deep and 80 feet to the peak of the roof from the level of the ground. It will stand in the middle of a block with its front on the street line. The whole block will be surrounded by a high wall and the part not occupied by the building will be used as a play-ground. The building is to be thoroughly fireproof throughout. It is planned in compact form to insure facility in management. In order to make the best use of the space it has been found desirable to adopt different levels for the two sides of the building as shown by the section. There will be a gymnasium on the south side occupying the height of basement and first story on the north side. On the north side the basement will be used for spray-baths, a plunge-bath, dressing-rooms and locker-rooms in connection with the gymnasium, while the first story will be occupied by cloak-rooms and reception-rooms. The lofty room on the north side of the second story will be used as a "silent study room" in which each scholar will have her desk and from which the pupils will go to the recitation-rooms which occupy the remainder of the building. The drawing-room, laboratory and science lecture-room being on the top floor. All the class-rooms are grouped about the central hall, which is lighted by a sky-light in the roof, and by direct sunlight through the south attic room. This hall is faced throughout with English glazed brick. The gymnasium and connecting rooms, the lavatories and the science lecture-room and laboratory are also faced with the glazed brick. In connection with the silent study room there will be a reference-library. Particular study has been made of arrangements which have been suggested as desirable by practical teachers in this country and abroad and a strict attention to these requirements has furnished the elements of the design of the exterior. In all cases the windows of class-rooms rise to the ceiling level and have sills high above the floor. As to the exterior effect, the building is to be a study in brown. Stone will be used to the second story and above that brown brick in three slightly contrasting shades. The roof will be of dark brown tile. The ornamental effects above the first story are to be produced entirely by the use of the brick of different shades worked into the designs suggested by the sketch. Thus the value of the masses will be retained without risk of such baldness as brick of one color would be likely to give. The high wall around the property it is hoped will give an effective base to the structure which will thus attain dignity in the simplicity of its masses while picturesqueness will be gained by the difference of floor levels and the variation of fenestration which this necessitates. Especial care has been given to the heating and ventilation of the building. The triangular prism at the peak of the roof is made use of as a horizontal ventilation-shaft which will be closed automatically to windward; the suction from the lee side aiding the special aspirating-shafts which are arranged to draw the vitiated air from all the rooms.

CHURCH OF ALL SAINTS, PASADENA, CAL. MR. E. A. COXHEAD, ARCHITECT, LOS ANGELES, CAL.

THE building is to cost about $26,000 when finished, but at present the outside only is finished. It will be of frame, the lower portions of walls being of a dark red stone; the upper parts shingled. The front gable is "half-timber work." Tower shingled.

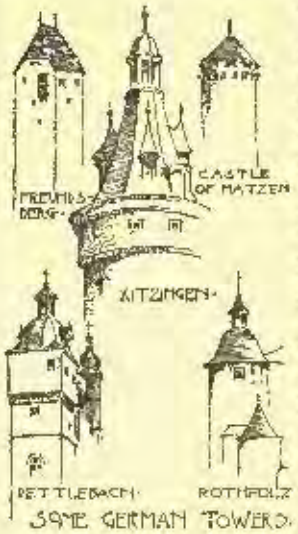
COMPETITIVE DESIGN FOR A SCHOOL-HOUSE, YONKERS, N. Y. MESSRS. HAMILTON & MERSEREAU, ARCHITECTS.

MATERIALS proposed. Stone basement, brick and terra-cotta above, with copper roof-finishings. Cost about $100,000.

CHURCH OF SAN MIGUEL, JEREZ DE LA FRONTERA, SPAIN.

THE MOHAWK BLOCK, BUFFALO, N. Y. MR. E. A. KENT, ARCHITECT, BUFFALO, N. Y.

SPECIFICATION-WRITING.



SOME GERMAN TOWERS.

HIS specification-writing is a matter of perennial interest, we need make no apology for copying in *extenso* from the *Journal of Proceedings, R. I. B. A.*, the following abstract of a paper on the subject, by Mr. T. M. Rickman, F. S. A., and the discussion it engendered:

Mr. Thomas M. Rickman, F. S. A., *Associate*, began by stating that the specification was one of the means employed by the architect to carry his design into execution. The design was in his mind. The drawings presented a reproduction of the design in scale projection; they were a representation of the idea in the architect's mind. The specification was the translation of the design into technical language, describing the selection of the materials and the construction of the whole. The duty of the writer of the specification was to translate the design, from all the materials at his disposal, into another language: from the image in the mind of the architect to a technical description of the work. The true specification should be in course of preparation all the time that the design was being elaborated by the architect. The general description of materials should govern the details of construction; and the work of preparing each should be simultaneous. The writing of a specification should be encouraged as part of a pupil's work during his articles, rather than the common course of education, which left that part of the art altogether to those who had passed through their period of apprenticeship. It seemed in some cases as if the architect-masters of the present day followed the discipline of Pythagoras, who, it was said, expected a probation of five years from his pupils, and afterwards instructed them in the meaning of the enigmatical sayings in which he involved much of his doctrine.

Before writing a specification, its purpose should be fully considered. Much might be said, as regarded the order of treatment adopted, in favor of each of the following courses, the varied influence of which might frequently be traced: (1) Giving directions as to general principles, leaving the details to the common-sense and experience of those who have to carry them out; (2) following the order of the quantities, and, in fact, only supplying a running commentary upon them; (3) following the order of the execution of the work; and (4) following the order in which the work would be taken when measured up.

For the practice of specification-writing, perhaps the most important mental quality, after patience, was decision, and the author considered that before writing a specification the mind should be made up as to the meaning and application of the following terms, about which there were varying opinions. Uniformity in the use of words, and the avoidance of varied terms meaning the same thing, would also be of great assistance in making a specification intelligible. *Allow for*, was a term which would not be used: it belonged to a bill of quantities, and should show that the extent of the work was at the risk of the contractor. *Provide*, was intelligible, if applied to quantities of materials and labor; if applied to sums of money, a very clear interpretation clause was needed. *Supply*, if used in place of the usual "provide and fix," increased the clearness of the specification, and avoided some prolixity. *Proper*, before the introduction of work in imitation of mediæval structures, had an intelligible meaning, as applied to lodged doors, door-frames, etc.; it was now safer to fully describe what was intended. *Sufficient* was a legal term which required breaking down so as to convey the intention of the writer; to describe the intention might save much trouble. *Best* had ceased to have any definite meaning through the introduction of the terms

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DE LA FRONTERA · SPAIN ·

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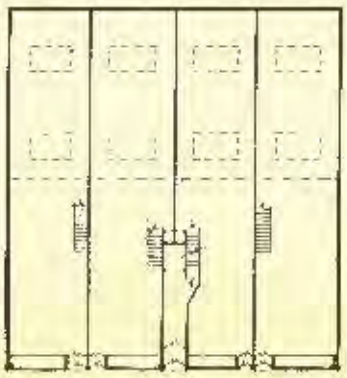
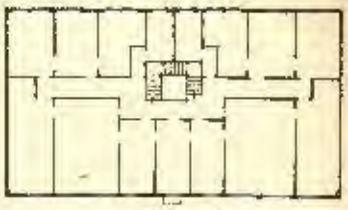
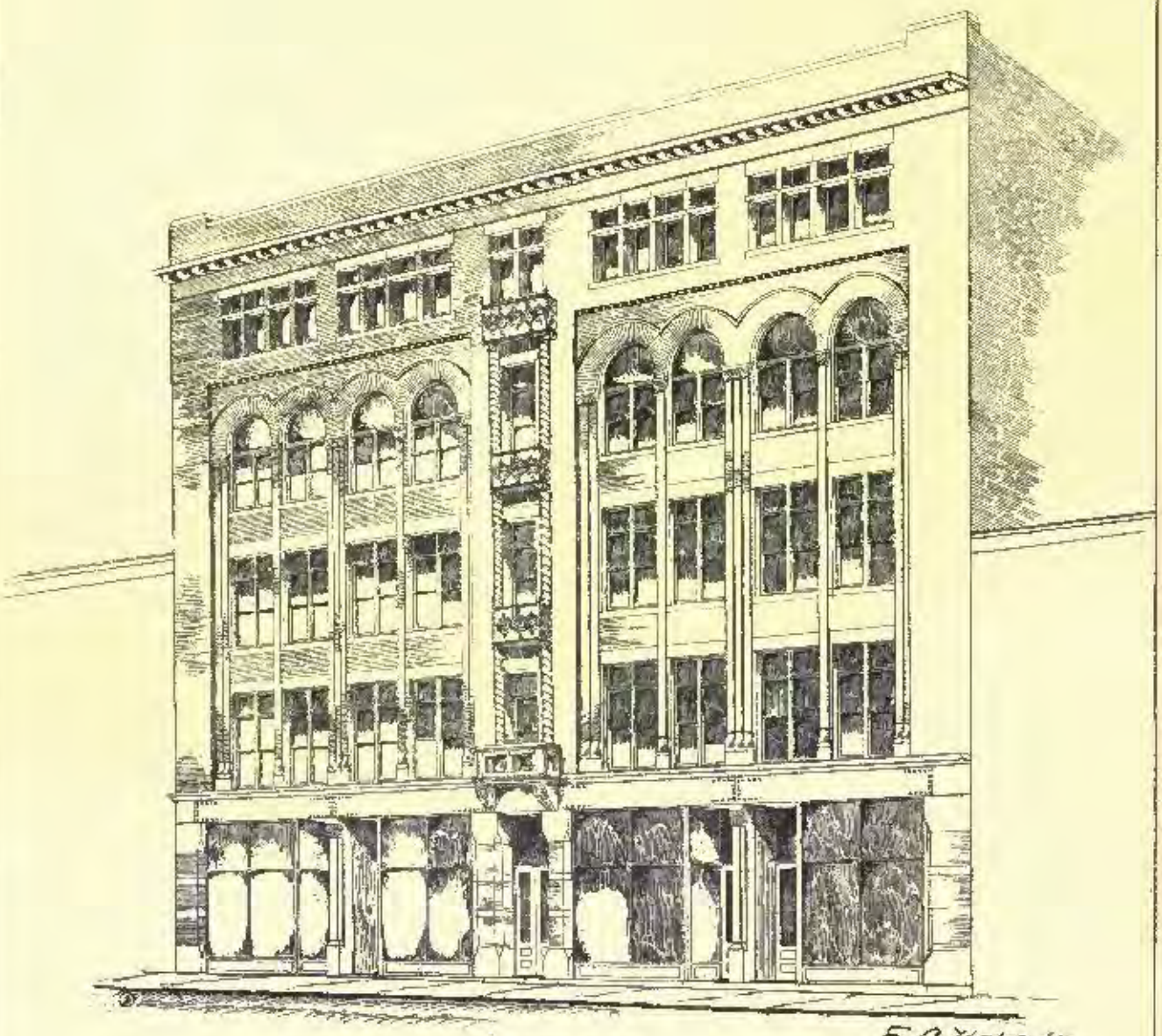


1st Floor Plan
Mohawk Block



2nd Floor Plan
Mohawk Block



MOHAWK BLOCK.

E. A. Kent Architect Buffalo, N.Y.

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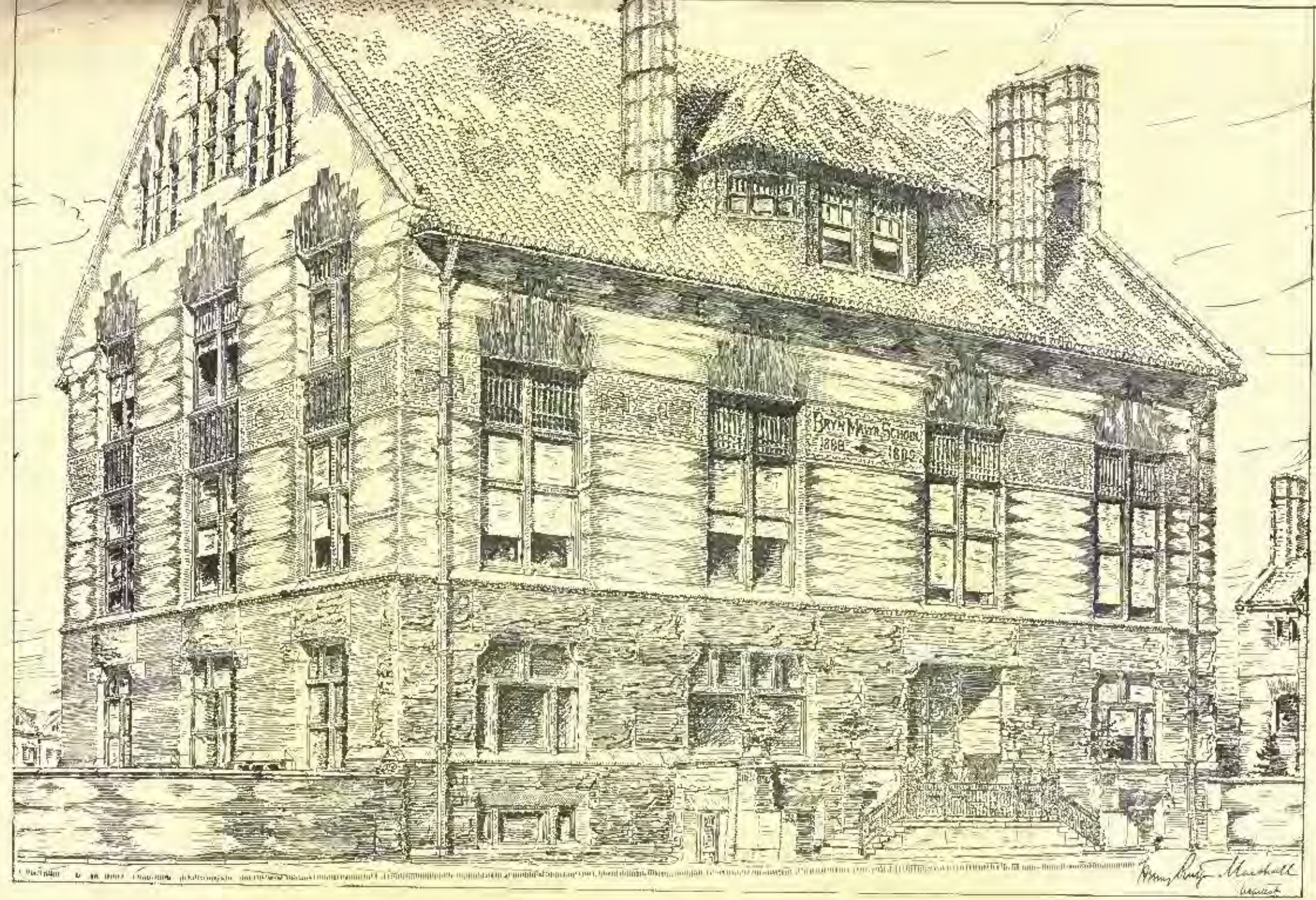

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"THE BRYN MAWR · SCHOOLHOUSE · BALTIMORE · MD ·
HENRY RUTGERS MARSHALL

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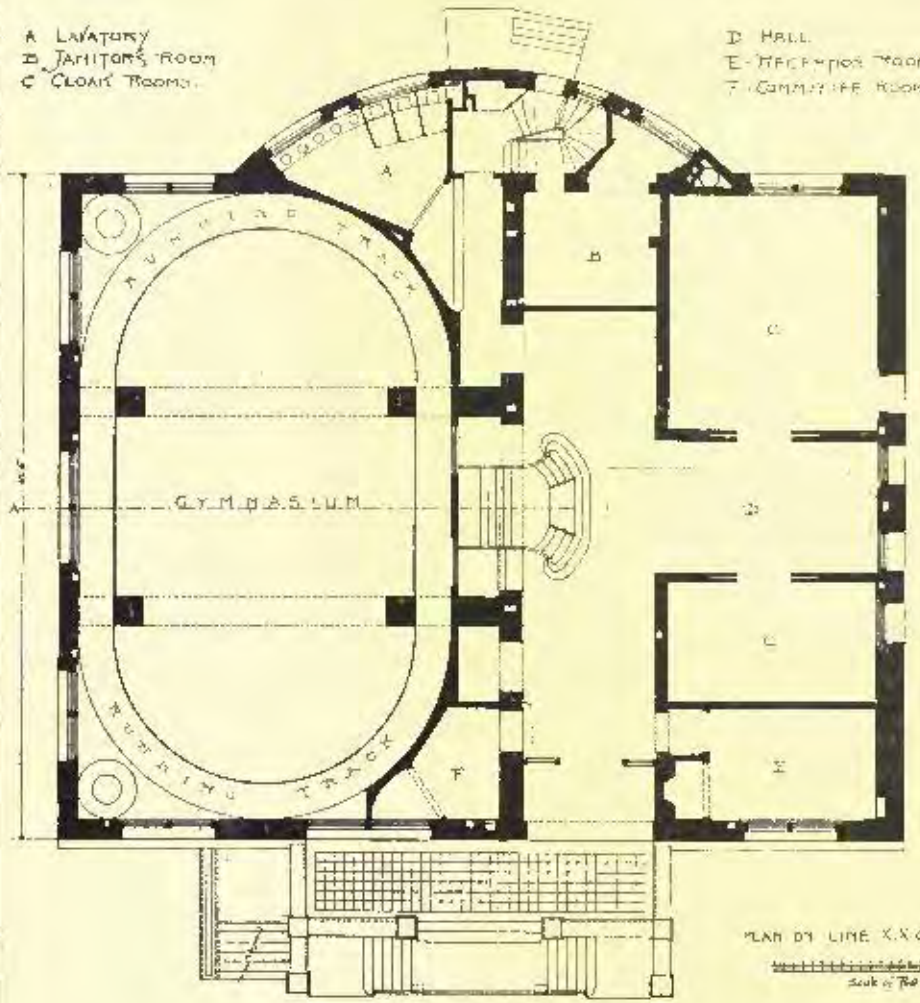
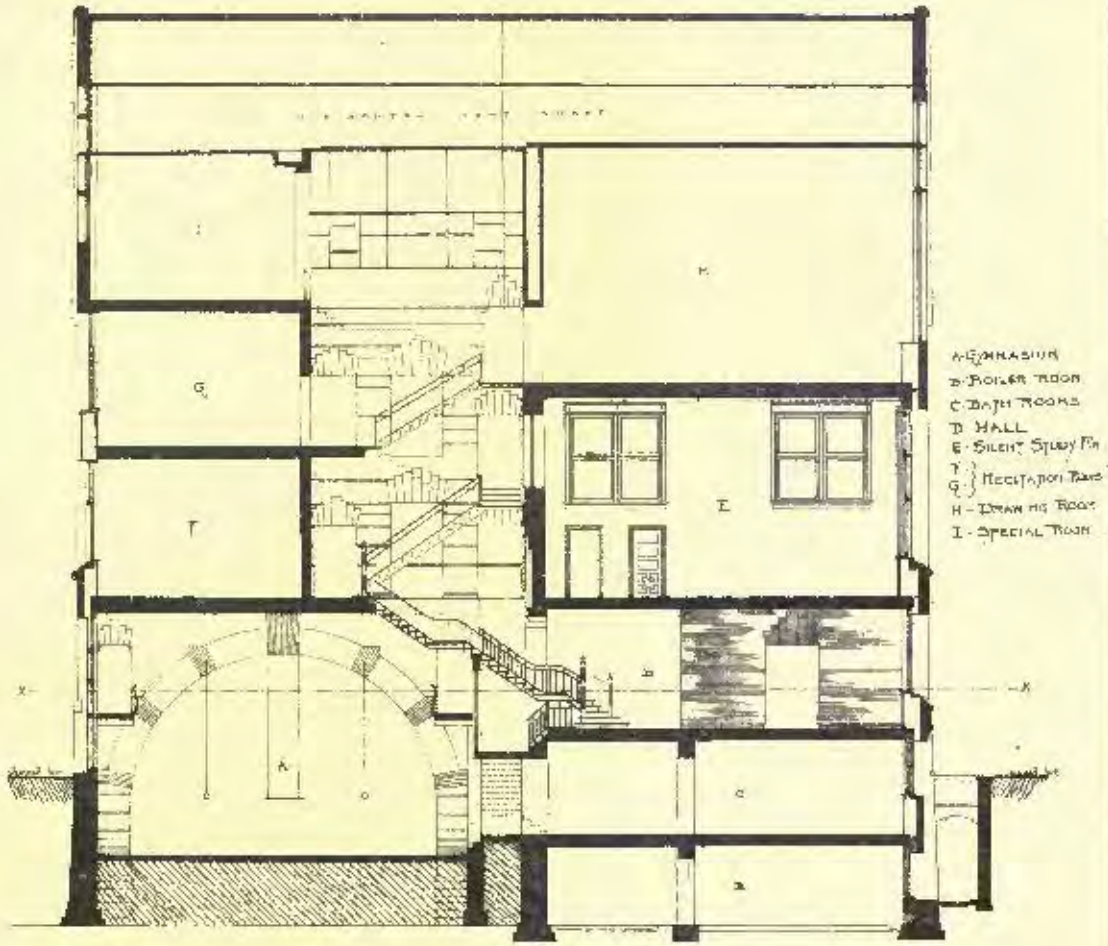
A LAVATORY
B JANITOR'S ROOM
C CLOAK ROOMS.

D HALL
E RECEPTION ROOM
F COMMITTEE ROOM



PLAN ON LINE X.X ON SECTION

Scale of Feet



A-GYMNASIUM
B-BOILER ROOM
C-BATH ROOMS
D HALL
E-SILENT STUDY Rm
F, G } RECITATION ROOMS
H-DRAWING ROOM
I-SPECIAL ROOM

SECTION ON LINE A A ON PLAN

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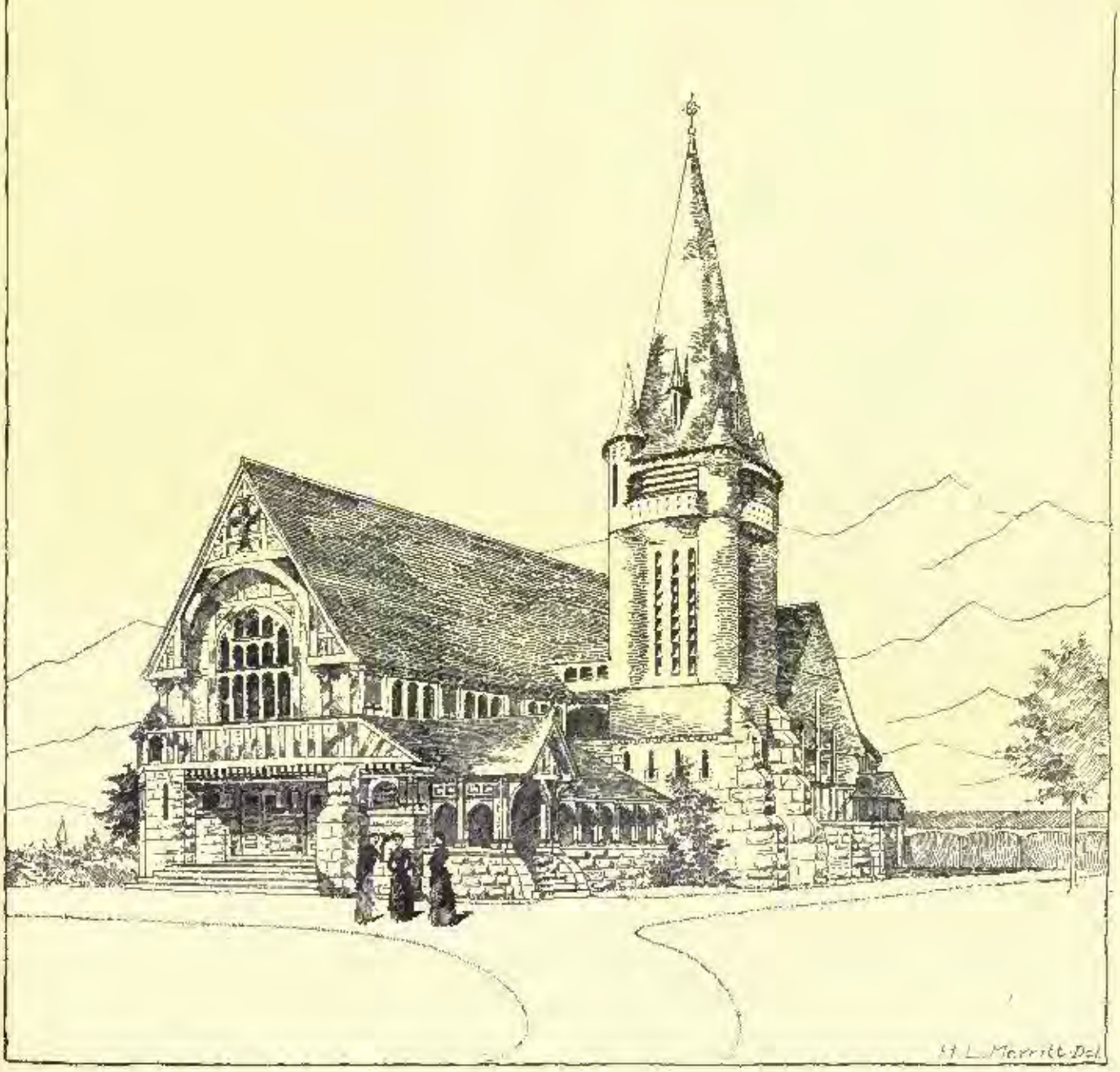
All Saints Church
Pasadena Cal.

Ernest A. Coxhead
Architect
Los Angeles



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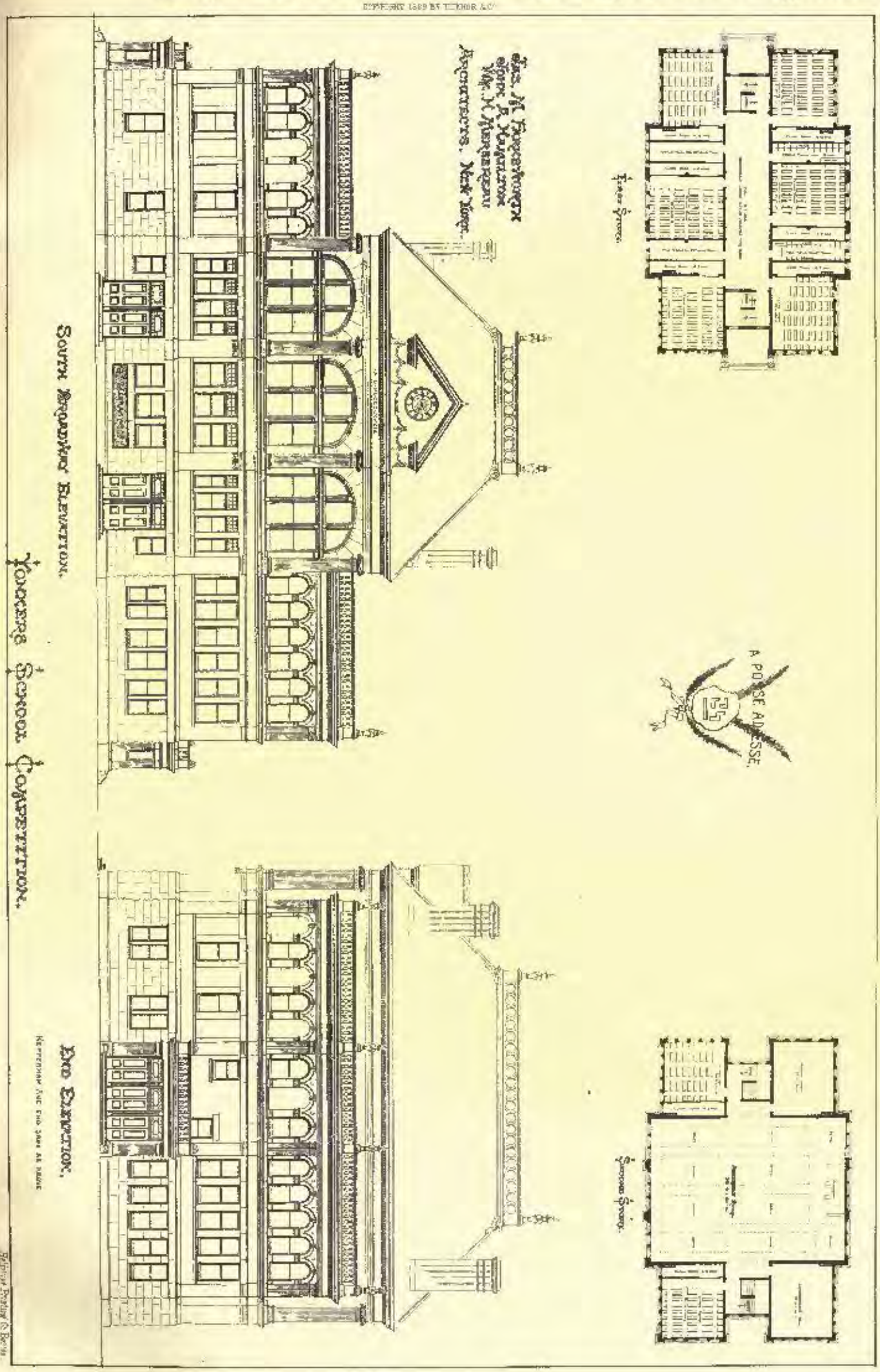

"Best Best," "Double Best," and the like. *Prime cost*, required explanation as to whether it was to be taken from the list-price without trade allowances, without also discount for cash, and also whether it had to be increased by establishment charges, carriage, or fixing. There were few occasions for the use of *To Fix*, which would not require some detail beyond the term. *Average* was a dangerous word, as it admitted of some of the work described being of less dimensions than were specified, and often nothing short of a measurement of the whole would clear up the doubts thrown on the execution of the work by foreman or clerk-of-works. *Sizes* should be explained as "out of," or "finished," and often at what time or in what position they were to be taken. Before *Attendance* was used, the amount of labor and responsibility thrown on the contractor should be clearly explained, and the Employers' Liability Act should be understood; the delay occasioned by other tradesmen should also be considered. The application of the term *Reinstate* to dilapidations was not considered by the author; to require a contractor to reinstate after accident, or after defects other than those of his own materials and labor, demanded a specially drawn specification; and it was sometimes better for the immediate use of the building to leave a small defect than to cut the structure to pieces in order to insert new material in construction, if power were retained by the architect to charge for renewal, when an opportunity allowed of the work being executed. *Local Requirements* should be mastered before they were referred to in a specification. *Watching and Lighting* should be explained, whether for the contractor's own work or for other tradesmen, whether for night work or for day only; the use of gas, firing and special lighting varied in each case, and no general clause was in all cases sufficient. *Search for Old Drains*: some knowledge of where the old drains were was necessary before drawing the specification. *Facilities* were to be afforded for inspection of work and for the introduction of other tradesmen for fittings during the progress of the contract, and it was only fair to define beforehand the extent to which this was to be carried, and the accommodation and responsibilities involved. If *Use of Scaffolding* was required for special purposes, or to be specially erected, attention should be drawn to the subject, as otherwise the ordinary words might carry only the use of scaffolding erected for the contractor's purposes, the extent of which varied greatly in different localities. The precise mode to be adopted in *Secret Fixing* should be clearly studied before writing the description. Before describing *Concrete* it was well to make up the mind whether absorbent or non-absorbent materials were to be used, whether burnt ballast was to be allowed or not, whether lime and cement might be mixed together, and whether the material should be shot into trenches from a height and left untouched under a penalty, or whether it was to be carefully laid without dropping, and then well pinned. Would the architect approve of *Art Tiles* if winding and out-of-shape? or would he insist on having as good workmanship in their manufacture, without seconds, as he would have expected from Hollins or from Maw? *Rubbish* and *Debris* were both dangerous terms, but occasionally used; they were supposed to mean brickbats: waste-paper and night-soil should be specified out of them. If by *Asphalte*, tar and sand was meant, it should be stated; if superior material in two thicknesses, the maker's name should be clearly specified. For *Flooring*, the mind should be made up as to widths of boards, thicknesses, whether from the saw, the mill, or the plane, mode of fixing, quality, finish and bearing. The *Ironmongery*, the sets of hinges and the mastership should be decided on, and if P. C.'s were given they should be continued throughout. The tests required for *Cast and Wrought Iron* should be resolved on, and who was to pay for the testing made clear, whether the material passed the tests or not; whether Belgian iron was to be used or rejected should be decided on, and the cost of special rolls remembered. The capacity of the ordinary bricks should be studied for *Brick Facings*; every special mould required would delay the building so many days; whether all bricks were to be firsts, or any percentage of seconds allowed, should be clearly stated; and, as regards pointing, whether the kind described was likely to last if executed with the brickwork ought to be ascertained. London and Manchester interpret the term *Old English Bond* differently; which was to be used should be determined and made clear, and in any bond it should be decided whether the perpends were really to be kept, and the necessary position of closers remembered. With reference to the term *Trapped*, the gases of the present day got through obstacles which in old times had been intended to stop rats; the water-supply forced traps formerly approved; and he considered decision as to the form of a trap the strongest proof of professional influence. The mind should be made up as to what *Bonding* or *Cross-bonding* gave the better bond between stone and brick; it should be remembered that the average lengths on the two faces of a quoin stone multiplied together did not give the average section of the stone quoin; and in what cases jamb-stones should bond within the face of wood-frames ought to be stated. *Joggles*: doubt should be inadmissible as to whether the material mentioned was stone or cement, or as to the cases where the joggle ought not to be stopped. It should be decided whether *Scarfings* were to be described by a general rule or in detail; whether to be invariably bolted, and whether to be used at discretion. In *Fixing Leadwork* decision was necessary as to the use of bossed-seams or wooden-rolls and other details; in some cases a judicious reticence was safer than doubtful detail. As to *Drain Pipes*, the new patent joints should be tried before specified; the tests defined whether candle, water or peppermint; the sizes stated, and the writer of the specification should be sure as to the construction of the bottoms of the access chambers before binding the contractor as to the mode of execution, and also as to which side of a trap the fresh-air was intended to be introduced. When *Centring* was wished to be close-jointed it should be stated. If the edges of *Plate-Glass* were to be blacked it should be noted. *Custom of the Country* should be studied with reference to stone-facings, and the mode of pointing, slating and tiling of all sorts, with bedding and torching appropriate. The selection of stones and the appropriate treatment of each was too large a subject for the author's present purpose.

Among the many things likely to be forgotten might be mentioned:—The possible necessity of driving the planking of foundations; the application of a rule as to footings to piers and special cases; the liability of misinterpretation of the width of bed of a stone; the amount of labor carried by descriptions such as moulded, stopped, enriched, fitted, veneered and the like; the accesses to cisterns, taps and many other things; and the selection of sizes and shapes to suit the market for the several materials. The objects of a writer of specifications would be the best gained if he first of all placed himself in the position of his client, but with his own better knowledge as to judicious expenditure; in the position of the builder, but with an art knowledge which the builder might not have as to the materials available; and in the position of the clerk-of-works and foreman in having to obtain from the workmen intelligent labor.

Discussion.

The Chairman.—There are considerable differences of opinion between architects as to the way in which a specification should be treated. Very few would have dealt with it in the elaborate and very explicit manner which Mr. Rickman submits to you as the proper course. Some I know held that the general description of the qualities of the materials and the general description of workmanship, in rather vague terms, was sufficient. This was sometimes thought the best way of dealing with the specification, leaving the elaborate drawings, with annotations and descriptions thereon, to convey to the workmen the intentions of the architect. Thus the workmen would have their instructions always at hand and before them on the face of the drawings. Even in that case there would arise a considerable difficulty in conveying the exact meaning to the workmen, and difficulties from omissions continually and frequently arose. With the complete system which Mr. Rickman from his great experience advocates, this difficulty would be less likely to arise; but he certainly would place the architect in the position of being not only a many-sided, but a multiform man, to be thoroughly acquainted with the minute details of every trade in the elaborate manner which would be absolutely essential to carry out his scheme. Probably he would receive great assistance, not only from the specification draughtsman in his office, but also from that now apparently indispensible adjunct to all building works, the quantity-surveyor, whose careful revision of the specification during the process of taking out the quantities would supply many of those minute details which the architect had perhaps, in the first instance, overlooked; and in that respect the services of the quantity-surveyor no doubt would be very great indeed to the architect, as in his process of analysis he would necessarily detect essential matters of detail which the broader view taken by the architect might have led him to overlook. Of the essential qualifications of patience, decision and accuracy of language, which Mr. Rickman invokes as necessary for the architect, there can be no doubt whatever. Of all things the first qualification for the architect undoubtedly is patience, and after that decision becomes an essential quality, in which sometimes, perhaps, we are occasionally wanting. Unless an architect has cultivated the habit of precision of language to which I have before alluded—a precision which enables him to make himself intelligible to others in the sense in which he himself understands his words—that decision will be of little value: and it is unfortunately, I think, in the experience of most of us who have had to deal with litigation connected with building matters, that such litigation arises too frequently from what I may call the looseness of expression and want of precision—where the intentions are expressed by words which, when read from another point-of-view, and read many months afterwards in a reference or in a court of law, will bear an interpretation entirely different from that which the architect intended to place upon them. Mr. Rickman's observations upon "best" and upon "prime cost" are also of very great value. Some years ago, when the term "best" began no longer to mean anything but the "worst," it was the ordinary practice to introduce at the head of the specification a declaration to the effect that the word "best" throughout the specification is intended to be used in its natural sense, and that no such perversion as "best best" or its equivalents would be entertained. There is another point, and that is the very complicated question of the employment of other tradesmen than the contractor with whom the contract for the main building is placed, and the facilities to be provided for the execution of those works which are not paid for by the contractor, or which are ordered by the architect as a provisional amount, and for which the contractor pays simply on the order from the architect, and concerning which the heartburnings and the differences between the builder and the special tradesmen, and the architect and the client, are often exceedingly great, and sometimes lead to considerable litigation. In the present day

that practice of employing special tradesmen has become so general that the provisional amounts included in contracts come sometimes to one-third, and in some cases I have heard of to nearly one-half, of the amount of the contract; and it becomes exceedingly important that the manner in which those provisional amounts ought to be dealt with should be clearly expressed.

Mr. E. T. Hall, *Fellow.*—Mr. Chairman, I am sure we have all listened with the greatest pleasure to the very able paper which we should expect from a man of Mr. Rickman's great ability and experience. As time is short, I will not refer to the general outlines of the subject to which you have made reference, but rather endeavor to deal with details. I will, however, first draw attention to a feature which, I think, is of the greatest importance. The architect should draw his specification as though no technical person like the quantity-surveyor was to follow him, and if he sets himself to work on these lines he will have a much more perfect specification. It will, of course, demand patience, and also compel the architect to cultivate that quality on which you have laid stress, viz., decision, which is of so great importance. If an architect does not know what he is going to do in the execution of his building, it is impossible that his clerk-of-works or builder should know it. Therefore, if he will study the work, analyze the building from the bottom to the top, and describe what is to be done, he will give the quantity-surveyor, if one is to follow him, much less labor, and he will have the gratification of possessing a knowledge of his building which the clerk-of-the works and the foremen of the buildings do not possess. The advantage and comfort of this to him will be appreciated when he is superintending the erection of the works. Well, Sir, Mr. Rickman has drawn attention to the fact that a specification should describe what is "to be" and how "to do"; the suffering, if the specification is negligently drawn, will be on the part of the client, and that is generally followed by suffering on the part of the architect, who hears of it again. Mr. Rickman says the writing of specifications should be encouraged as part of a pupil's education. I think the writing of the specification, by which I understood him to mean the original writing of the specification, can hardly be part of the pupil's work. It requires the very greatest experience, I think, to write a specification, and it is eminently work for the head of the office; but the pupil learns how to do that by being set to copy specifications. With regard to loose expressions in specifications, for such phrases as "provide everything that is necessary," and that sort of thing, of course there can be no justification whatever. They lead always to trouble, and frequently to those arbitrations which we occasionally hear about. Sir, Mr. Rickman objected to the expression "allow for," as a term which is very indefinite, and I think his remark was that questions would arise in the builder's mind as to how sums were to be calculated under such a direction. There are certain items which I think may very reasonably come under that heading. For example, an architect in London is re-creating a building which is surrounded by old sheds. I think it is a sufficient description for him to say, "allow for the necessary shoring and boarding-in of adjacent building disturbed by removal of the party-wall." This is a perfectly intelligible description, and it is not a loose description either. Then, Sir, with regard to the trade terms to which attention has been drawn, "best best" and "double best." I should imagine, and I think I am not saying anything improper in suggesting, that these originated from the desire of merchants to assist the builder in —what shall I say?—evading the common-sense meaning of the word "best." We find that in trade phraseology "best" is not best, but may be a third-or-fourth-rate article, and that merchants are in the habit of using other terms to indicate something superior to "best." In plain English there can and ought to be nothing superior to "best." With regard to the vexed question of "prime cost": I hope before long the Institute may see its way to have a definition of prime cost, and so prevent the trouble and heartburnings which have arisen. Prime cost can have but one meaning. It means the first cost which the builder pays for the article specified. It can have no other legitimate meaning. To say prime cost refers to prices in any catalogue, with perhaps a discount of 70 or 80 per cent attached to it, is a perversion of terms. I think if it is clearly laid down that prime cost means nothing more nor less than the actual cost the builder pays out of his pocket for the article supplied, no injustice will be done to any man, and that which the architect means will then be clearly expressed and understood.

Then, Sir, with regard to architects' knowledge of the Employers' Liability Act, I do not quite follow Mr. Rickman that this is essential. That is one of the responsibilities which the builder, in making his estimate, should contemplate, of course; but it is not necessary that the architect should express in his specification the liabilities under which the builder, as an employer, comes by an Act of Parliament. As to the question of "re-instating," I quite agree with your views, and I should venture to press on this Institute a clause in the Conditions of Contract dealing with the subject. It may not always be desirable to remove a thing which may have wrongly got into a building, either by accident or design—we will say by accident. You have specified something—by accident something else has got in. Now, if you are doing your strict duty to your client, you can insist upon that being taken out; but possibly, in doing that, you may do almost an irreparable injury to the building. Under your contract, as you usually draw it, you must either take that out, in order to have the specification conformed to, or you must leave it in, in which case you cannot certify that the building is complete according to specification. It would be a very reasonable thing that in the conditions of contract provision should be made by which, where such a thing happens, the architect's discretion may be used, leaving him the power to allow the "wrong" thing to remain, and making such adequate reduction as will give his client, the building owner, the benefit of the difference in value between the article which was specified and that which was put in. Another question comes in with regard to the architect's decision. A very common expression is that the timber is to be absolutely without sap. For joists and things of that kind, it is almost impossible to get timber which is absolutely without sap. A trifling piece of sap the size of one's fingers on the edge of a joist is no fault whatever. It does not prejudice the building, and it is reasonable that such a thing should be passed. It is not reasonable that you should have a clause in your specification which says that no particle of sap will be permitted in the building if you intend that there shall be. It is not fair to the builders who compete. One who does know that you are reasonable in your interpretation of that will have an advantage over another who does not know it. I apprehend that "watching and lighting," under a contract, applies to the work which is included in that contract. In other words, if you say "provide watching for works," it applies, and can only apply, to the work which is the subject-matter of the contract. Therefore, I think, a general expression of "watching and lighting" will mean that you are to provide that which would light all the works by day or by night, or as you may specify. As to searching for old drains, if we know where the old drains were, we should not use the expression "search for them." Take the case of an old building in London. If you are pulling down a building two centuries old, you may be positive you will discover an old cess-pool or some old drains under your floor. But the architect has not a staff of men to take up the floor or to excavate under the old vaults. Indeed, until the old building is pulled down, it might not be safe to work under the old foundations. I think, in such cases, you could not put anything more definite than simply "search." With regard to asphalt: the architect must, of course, specify what he wants. If he simply means tar and sand, he should use the expression. But I suppose, where British Lava Asphalt, or some of the more expensive asphalts are used, such as Claridge's or Seyssil, the architect would, as a matter-of-course, say so. Again, Mr. Rickman's description of stoneware pipes is an exhaustive one; but I think if, instead of that description, he had said the drain-pipes must be "perfection," he would have said all that was wanted, and he would be as likely to get them perfect. He describes "torching." I have found there is a considerable difference of opinion as to what torching means; torching, as understood in many countries—Sussex, for example—is simply pointing the inside of the tiles with mortar, just covering the joint; but the system of torching introduced in other places, and the one that I always personally adopt, is to render the whole underside of the tiles flush with the battens. Another thing which is of great importance is with regard to the specification of plumbing. Now, with regard to lead-piping, nothing is more common, and, at the same time, more objectionable, than the possibility of a pipe bursting in a house, or of some apparatus getting out of order; and the thing which is very often omitted from the specification is that provision shall be made inside your own premises, by means of a stop-cock for shutting off the water in the rising main, by which means you can at any time save a burst of your pipe by having no water to freeze in it. Another thing is to have a stop-cock where the supply-pipe leaves the cistern, by which means, if the apparatus at any particular spot is out of order, you can turn off the stop-cock of that branch and shut off the water in that branch, leaving all the rest of your sanitary appliances at work. Where that is neglected—and it is very commonly—if any one water-closet in the house gets out of order, everything else is thrown out of use. Sir, if I may be permitted to do so, I should like to conclude my remarks by moving a vote of thanks to Mr. Rickman for his very able and most instructive paper.

Prof. T. Roger Smith, *Fellow.*—Mr. Chairman, I think, perhaps, we may be in danger of going a little from the question of the nature of a specification to the question of the nature of things that should be specified. Our friend, Mr. Rickman, has tried to turn our thoughts to the somewhat difficult question of grasping exactly what a specification should be. He has told us some of the qualities that go to the making of it, but I think there are one or two others that might have been named, and upon which he did not lay much stress. He mentioned, and very properly, that a man should have patience—it is a work that wants a good deal of patience—and that he should have decision. I am inclined to think that it is equally important that he should have knowledge. Unless a man knows thoroughly what materials he can get; what things tradesmen are furnishing; what will be expensive or the reverse; what will be inefficient; what will answer his purpose; what will conform to the general scheme of the building, he is very much abroad indeed when he comes to write a specification. A man, when he is going to write a specification, will often find that he must furnish himself with knowledge, and in many cases he will find he then has to get up a good deal of information, especially if the specification travels at all out of the track which he has done before. One other quality, I think, is very essential, and that is system. A man should, as far as possible, in that, as in many other technical parts of his work, proceed uniformly on the same lines. I believe a valid, and in many respects a good, specification may be

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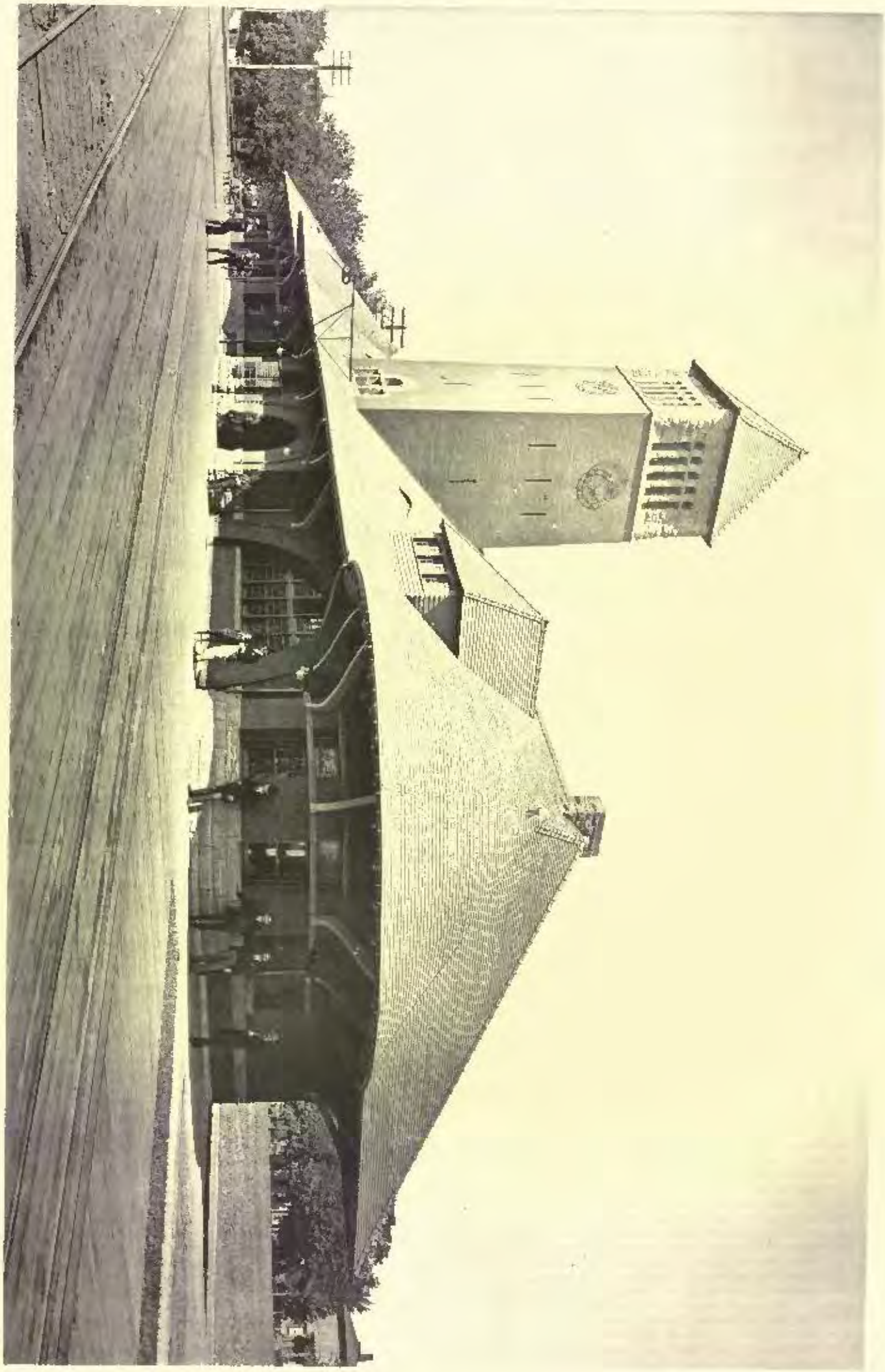

RAILROAD STATION, BATTLE CREEK, MICH.

ROGERS & MacFARLANE, Architects.

written comparatively short, describing in general terms the work; but then it must not go into particulars in any part. On the other hand, if a man begins to go into particulars, he ought to go into particulars for every part of his specification. He should, therefore, lay down a system for himself, and adhere to it. One remarkable point struck me during the observations that have been made. Years ago, buildings were done by various tradesmen, and the object of the specification was evidently to give each tradesman a description of that part of the work which fell to him. The ordinary specification of the present day is done as though it was to be carried out by a series of different tradesmen, and the information requires to be fairly complete for each branch; but no doubt this practice took its origin from the ancient custom of the work being done in this manner. Later on, we got to the very convenient mode of having one contractor doing every class of work, and our specifications are made up in one volume, although they still contain a division into trades. But the curious thing is that now we are going back to the old plan. Our Chairman pointed out that specifications exist in which one-third, and even one-half, of the contract amount is introduced in the shape of money-provisions. Now that is simply employing different tradesmen. A money-provision is, in fact, a kind of allusion to a distinct specification, which may exist or may not exist, but which in many cases does exist, in the nature of a distinct estimate which has been previously obtained from some special tradesman; and it looks to me very much as if to a certain extent we were feeling we had gone a little too far, and we were barking back and getting more of our work done by separate estimates than a few years ago was the custom. The sole reason, or almost the sole reason, why it is desirable to include all this by the help of money-provisions under one contract and in one specification is to get the supervision and the control over them that the general contractor exercises. I am not at all sure that that is not sometimes bought too dear; that disputes and difficulties about how the money-provision is to be construed, and how it is to be paid, and the troubles which we all know are apt to arise, would not in many cases be almost better avoided by the architect making a series of distinct contracts for his employer with many of the special tradesmen, and simply making a contract with the general contractor that, in respect of their work, he is to provide the necessary attendance and the necessary scaffolding. At any rate, it strikes me it is a point which is worth consideration. When you come to look at so large a portion of the work being done practically without description, as is the case where these money-provisions abound, the question arises very much whether we require the descriptions of which a specification consists for working purposes or for some other purpose; and the idea suggests itself that a specification is required as the basis of the contract, and not that it is necessarily needed as a description of the work. If you are going to carry out work without a contract —I have had an opportunity two or three times of carrying out work without a contract — practically you find that whatever specification there is becomes almost useless. The drawings and the personal directions practically suffice; and if there was no question of contract, if there was no question of having a definite sum wanted, to be first arrived at and then adhered to, I question very much whether, if a man makes good drawings, it would be necessary for him to make anything more than a general specification. Perhaps Mr. Rickman will give us his view on that. But, if this be so, it shows that we ought to have the question of the contract in our minds in writing the specification from beginning to end; that it ought to be such a document as you can call upon the contractor to carry out in every description; and, if so, the next thing which follows is that the nearer it runs to the quantities the better, because in all our work the quantities are practically the foundation of the contract, and the document upon which the contractor forms the idea of what he has got to provide and what he has got to do. If, then, a specification is really wanted as a basis of contract more than anything else, then I am inclined to think that the more closely he follows the order and terminology of the description upon which the quantities are based, the more likely is it to enable the architect to carry his contract through without serious extras. If so, that seems to show that those gentlemen who get the assistance of the quantity-surveyor, at any rate, to expand their specifications are not altogether unwise.

Mr. William White, F. S. A., *Fellow.* — Mr. Chairman, in former days it was almost the universal practice in the country for contracts to be taken by different tradesmen together, simply because the locality was such as not to justify at that time the existence of a general contractor. I have had contracts carried out by separate contractors with dispute and without dispute; but I do not know that I have ever had them as pleasantly carried out as with a single contractor. As to the question of provisional sums for certain works, which are intended to be taken out of the contractor's hands, or to be executed independently of him, they require to be very carefully understood and described in the specification to show the understanding which is to be made between the builder and the men supplying such work. Some contractors insist, and very rightly insist, upon having an understanding beforehand as to what that recognition should be, and it is essential, in the writing of a specification at any rate, that it should be clearly laid down. That covers the question of prime cost, but it does not cover the manner in which prime cost is to be defined. Is prime cost to be that which the builder pays without a commission or with a commission — the actual money which he pays, or the published price at which the thing is to be had? I have known builders take not only the one, but add the other on to it. I have letters from which I could show the fact of a gentleman selecting his grates, and the builder getting his 10 per cent out of the stove-maker, and then still attempting to charge his further 10 or 15 per cent upon the work. That having been done, it certainly shows it can, and will be done, unless the matter is properly understood. But, in drawing a specification, as Professor Roger Smith has said, system and knowledge are necessarily the two great items, and I think the system which ought to be followed is that of simply describing the work — the work to be so-and-so — and to include in all those items the manner in which the work is to be done, as nearly as possible, and not to insert that the contractors shall do this, that, and the other. I say the proper place for describing his duties is in the contract — and if there be not a contract there ought to be one; but if a contract is not wanted, the specification answers every purpose as to the description. Another thing in writing a specification is to make all necessary local inquiries as to local ways of doing work, as well as as to local material. The writing of the specification ought to be done immediately upon or *pari passu* with the preparation of the drawings, and I unhesitatingly say that the architect ought to draw the specification distinctly and clearly for the surveyor, as well as for the contractor. The surveyor ought not to draw the specification for the architect. It may be the duty of a surveyor to detect and point out any little omissions which may have taken place in the descriptions of the specification; it becomes his privilege and his duty to do this small kindness for the architect.

Mr. Lacy W. Ridge, *Fellow.* — Mr. Chairman, the Practice Standing Committee have now before them the subjects of general provisions and specifications, and these questions with regard to prime cost and so on have been to a certain extent considered, and will be considered more by that Committee. That particular subject of prime cost is certainly a difficult one, because if you tell a builder that the thing is to be prime cost, and that he is to add his profit to it, when you send in the account that the tradesman is to be paid, he wants a discount from the tradesman for paying him then and there: so that it is a very difficult subject indeed to get quite to the bottom of, because a man may very fairly say: "Yes, I was to provide so much, and I was to add in my estimate so much for my profit on that work, but I shall take my own time when I pay for this work." Where other tradesmen are employed — and it is a very great advantage in these days employing men who devote their time especially to one particular of a building, in such important things as fireproof floors or lifts, and things which require a great deal of mechanism and special experience — it is a very great advantage to bring in men who devote their whole time to that, to work on a building. Therefore, I think in drawing our general provisions, and in the provisions which we make — I think we should be prepared to provide for that. I do not think Mr. Hall's objection holds right with regard to watching. There is no reason why a contractor should only watch his own works; if it is well understood in the specification that he is to watch all works, he takes that just the same as the supply of water, and everything which is general to the building. Then with regard to searching for, and provision to search for, drains — a description to search for drains. If the architect cannot search for drains before he draws his contract, how can the builder know what allowance he is to make for searching? Therefore such a thing as searching for drains should invariably be followed by a provision for money. Your client may or may not like it, but it is the only fair way of making a contract. If the thing is so uncertain that you cannot define it, surely you are not to call upon another man to define that which you have failed to do, and put down a sum for it — in fact, to throw his hat at it. You — or rather your client — ought to take the risk by putting down such a sum. I can understand Professor Roger Smith's remarks about wanting the specification in general terms when you are not making a contract; but where the object to be attained is to make a contract, I cannot understand how a specification can be anything else than full. I feel a little difficulty in what Professor Smith says with regard to writing a specification by trades. I think we must all have found out in these days, with regard to sanitary matters, that there are things which used to belong undoubtedly to the plumber, which have become, to a great extent, earthenware and stoneware; and to put one part of the sanitation at one end of the specification and the rest at the other end of the specification is rather awkward. I have been thinking almost of heading a trade "Sanitation," so that the work of one's closets and pipes should be all together. I agree most heartily with Professor Smith's remarks. It comes home to one as one gets older that knowledge is, after all, about as important a quality as any that you can bring to bear on such a subject as a specification — which is not as difficult, I may venture to say, to younger men than myself, as it once was — and I think if that is the case it is really owing to that accession of knowledge which comes with increasing years and experience. Then there is a point on which one might feel inclined to be a little eloquent, if eloquence was not out of place on such an occasion, and if I had the supply of material to lay on — and that is with regard to the specification following the quantities, and the quantities following the specification. Now, honestly, is it not the duty of the architect to say what he means and to put it in? Has it anything to do with the quantity-surveyor at all? Then there is a very practical harm which arises

out of allowing the quantity-surveyor to write your specification, and that is, you do not know what is in your contract.

Mr. H. Lovegrove, *Associate.*—Mr. Vice-President and Gentlemen, I rise with very great pleasure to support the vote of thanks to Mr. Rickman for his able paper, because I consider him to be the head of that branch of the profession to which I have given a considerable part of my time. So fully has every item been dealt with that we have little to do more than to touch briefly upon some of the leading points, taking care before doing so to express great admiration for the concise form in which Mr. Rickman puts his papers together. I can only compare him, from an architectural point-of-view, to what the late Lord Chief Justice Cockburn was in a legal way, and Canon Liddon in a clerical way. If a written specification is supplied by the architect to the surveyor, the surveyor has a very great inducement to follow the order of his quantities, which is a great advantage to him, as it enables him to compare the specification with the bills, and make them check each other; but by so doing the specification is made into a document which does not agree with the order in which the work is executed. Of the several ways, the third way of placing the matter in the specification in order of execution is certainly best, and the architect should then consider in writing the building in its various stages, and carefully describe each operation as it passes before his mental vision. I agree with Mr. Rickman that "allow for" should not appear in the specification. It is clearly a phrase intended for the bill of quantities. "Provide" should always have the subsequent words very clearly explained. The word "provide" to my mind should rarely be used in the quantities. In referring to materials, it is much better to give the number, weight, or quantity, and then recommend the word "provisional" after. I have known the word "provide" misunderstood by the contractor. It is not quite certain that the word "supply" would always meet the case if used in lieu of "provide and fix." Some cantankerous contractors would be likely to assume that to supply the thing did not mean fixing it. I agree with Mr. Rickman that the word "fix" alone does not adequately represent what the architect means. Some other words are necessary. With our present range of design and work we should certainly be careful to specify exactly how these things are to be done. The *prime cost* question has been touched upon by a great number of speakers. It seems to me to be the one thing in the specification on which the architect and the builder can never agree when the settlement comes—and I think, as a former speaker stated, the builder wants to get his profit from the seller, and then to put another profit on afterwards. I think it should be distinctly laid down that the prime cost means the money actually paid to the merchant by the builder, and then his profit of 10 per cent or 15 per cent should be added to that amount. Local requirements should certainly be understood and defined care be taken to instruct the contractors to deposit their plans as early as possible—in fact, before they commence the work. That gets over a great many difficulties; it gets over the difficulty with the vestry or the district board-of-works with regard to drains, and it helps to solve some points of area lights, building line, etc., and difficulties are then smoothed over by the earlier application to that official. In the case of architectural drawings for any large work there is something to show, but with twenty or thirty or more pages of foolscap there is little to show, and the more or less neatly written pages cannot compare with several sheets of elaborately tinted drawings.

Mr. W. H. Atkin-Berry, *Associate.*—I have been very glad indeed, Sir, to hear to-night this particular question of prime cost brought so prominently forward, because, as a young architect, I have experienced the greatest difficulty and embarrassment in dealing with this subject, and I think many others have experienced the same. I am glad to hear it so definitely expressed to-night that the specification is still to be regarded as the work of the architect, and not of the surveyor, for I, in my small experience, have had the opportunity of noticing that it has become the custom, amongst a great many, to look upon it as work that can be delegated to the surveyor. The architect should have as much control over his specification as he has over his drawings; and I think he should not let the surveyor write them, any more than he should let his clerk design his drawings for him. I would just like to ask Mr. Rickman in his reply to define a little what he meant by his observations on the word "trapped."

Professor Aitchison, A. R. A., *Member of Council.*—Mr. Chairman and Gentlemen, this is a subject in which everybody who has to practise architecture must take a deep interest, and I am sure we are all extremely obliged to Mr. Rickman for pointing out many things that we are perhaps too apt to overlook in our specifications. There are two or three considerations with regard to specifications that perhaps do not even come within their scope, but which really affect them more than anything else. Most of us who know our business could write a very good specification if we had time, quiet, and the drawings before us; but it frequently happens that we are pressed for time, and worried as well, and are urged by our client to get the work out for tender, and then the specification is done in a perfunctory way. Architects, too, are very insufficiently paid for doing it properly. There are many great advantages in employing a contractor; there is but one set of plant, and one responsible head: but if you want first-rate work done you would go to the master-tradesmen of each branch, as he takes a pride in the excellence of his work. The principal cause of the difficulties we have in the interpretation of a specification is that, though the architect may be honest and know what he means, and the builder also, yet it by no means follows that the architect has so expressed himself that the builder perfectly apprehends what he wants, particularly if the work in question is out of the common way. And how it is to be avoided unless we have more time to devote to it, and an independent interpreter before the tender is made, I do not know. A great deal has been said about prime cost, so I may say something on the subject both for the architect and the builder. The specification says: "such an article is to cost so much, prime cost, the builder's percentage to be added." Generally, the article has to be sent for—and, consequently, the time or the cartage, or both, are very properly added to the cost—but, to prevent imposition, the surveyor can always insist on seeing the receipt for what the builder absolutely paid, and it is then to be considered whether he is entitled to additional payment. I always set my face against the discount and the profit as well; this common practice is very unfair and very troublesome when the architect desires some particular article to be used. There are only two other subjects on which I want to say a word; one is on the subject of moulded bricks. I strongly advise all architects who have anything to do with moulded bricks to insist on a larger percentage than the ordinary one for himself, and not to bind the builder to time, because it may be impossible to carry out the latter condition—the bricks cannot be moulded till the contract is let, and may turn out badly in the burning, and the architect will find he has endless extra trouble and annoyance, and to give full-sized details of every angle brick. I do not know whether "proper" has gone out of fashion, but it appears to me that, if you described it, that you were justified in telling the builder to supply it. Almost the only use of it is for solid door and window frames; and, as far as I understand it, a "proper door or window frame" is one which is wrought, rabbeted, and beaded; but if by the word "proper" you mean to have it chamfered or moulded, or anything of that kind, then you are giving a wrong description, and the builder may justly claim for the extra work.

Mr. Woodward, *Associate.*—I think the Institute is to be congratulated upon having had brought before it a paper on so important a matter, and I venture to say that there is not a man in the profession who is better able to write upon this subject than Mr. Rickman. The theme which harmoniously runs through Mr. Rickman's paper is this: that it is not well, it is not proper, that the writer of the specification should depute to others the elucidation of that which, by a little extra trouble, he could himself elucidate. I think the importance of the specification is shown by the use to which it is constantly put from the beginning to the end of the building by the builder and by the building foreman. I think a walk through a building shows to the practical eye not only the design of the architect—the realization of the drawings—but those various points to which Mr. Rickman has so well referred—the realization of the specification. I think a specification should mean this: that, supposing the architect died, or should be compelled to be absent from the building during the whole time of its erection, the specification, taken with the drawings, should be sufficient to secure the entire carrying out of the work in every detail as he would wish it, without any further conference whatever. To this end it is obvious that the specification must be written with considerable detail, for the architect's own mind must be implanted into it as much as into the drawings. With regard to the use of the word "best," Mr. Rickman says that, for reasons which he properly adduces, he does not now employ it; but in specifications I use the word in this way: the word "best" is intended to mean that better cannot be obtained; that enables the architect, when the builder supplies inferior material, to say, "I will get you better," and thus conform to the terms of the specification. With regard to the provision of scaffold for other tradesmen by the contractor, that is by no means an unimportant point. The making good after other trades often entails upon the contractor serious and heavy loss. I must express my deep regret that Prof. Roger Smith has, I think unwittingly, made observations which may lead the student to undervalue the importance of the specification. As I understand his observations, they point to this: that the architect need not devote so much time to the specification as certainly I and others in this room have been in the habit of believing it his duty to do. My belief is that, if any such doctrine is put forward, the young architect, with every desire to avoid what he now thinks is drudgery, will take advantage of Professor Smith's observations, to the disadvantage of his client, to the disadvantage of his building, and certainly to his own detriment as an architect.

The Chairman.—Gentlemen, I tender on your behalf to Mr. Rickman a cordial vote of thanks for the paper that he has read to us this evening. It has been a great satisfaction to me, Mr. Rickman, to occupy this chair this evening; and I hope the manner in which the paper has been received, and the way in which it has been discussed fully and temperately, have given equal gratification to you.

Mr. T. M. Rickman, F. S. A., *Associate.*—Mr. Chairman and Gentlemen, I feel greatly the kind manner in which the Institute has received my efforts in behalf of the Literature Committee, and also, sir, the kindly manner in which you have expressed it. Some speakers have suggested that "best" ought to be sufficient; but many architects do not mean to have the best things. You do not mean to have the best class of materials for warehouses; you do not mean to have the best framing for attic doors; you do not mean

to have the best glass in your rooms generally. "Best" has a curiously technical description in glass — it means you have, perhaps, selected it out five times. You do not generally want to have better glass than seconds. As regards the general question of provisions, I have not gone into it on this occasion. I did not feel it was possible to compress what must necessarily be said on that subject into a paragraph that I could afford in a paper upon specifications. I understand that the subject is to be discussed at the Builders' Institute in the course of a few weeks, and it will be very well indeed if architects are able to present themselves at that discussion, and to take part in it, in order that they may understand what builders' views are with reference to the large proportion of provisional sums which, as our Chairman has said, are now frequently brought into the contract. The one real difficulty in dealing with provisional sums is the payment through the contractor. It is quite true that, a generation or two ago, in each case in erecting a large building, separate tradesmen were employed, and in the earlier part of this century there grew up certain large contractors who did everything themselves, who understood all the trades; but at the present time we are, by way of provisional sums, re-introducing a separate contracting-system. I suppose that what is really necessary in order to clear up these difficulties, which are difficulties that the surveyors and the builders are feeling at the same time, is that we, as architects, should have a better understanding with our clients; that our clients should better understand what the position of the contract is — what can be contracted for, and what items it is far better should be placed at a price already settled in the hands of other tradesmen. If the client understands really what the position of these matters is, he will very soon find that it is far better for him to pay for these things direct, and to pay for, among other such things, the surveyor's quantities direct, than it is for these sums to pass through the hands of the contractor, who will necessarily pass the plane over them. I do not think a pupil, before he has had five years in an office, is much capable of writing a specification that would be of service; but I do think that if the notes for the specification were in the hands of the men who make out the drawings in the office, and of the pupils among them, the pupils would understand far better the purpose for which the drawings are made out, and the drawings themselves would be far better. It is not necessary that these notes should be elaborate, but an architect, if he has made up his mind on any one point, should put it onto a scrap of paper, and that should be in the hands of the draughtsmen to assist them. Prof. Roger Smith says that I have not recommended knowledge. I think the first necessity of the mind which I propounded in my paper was one which I put before patience and before decision; namely, curiosity. I mean by curiosity that interested desire to find out how to do things which will enable you to get the knowledge on specific points necessary for you to write a specification. I have endeavored to avoid giving any instances in my paper (the only instance that I have given has been misapprehended), and, therefore, I had not stated the circumstance which induced me to mention searching for drains. One speaker alluded to the word "supply" as not being necessarily understood as providing and fixing. I am quite aware of that, and, therefore, I think one of the first interpretation clauses in a specification should be that the word "supply" carries the meaning of the ordinary words "provide and fix." I have not made myself quite clear on the subject of "trapped," because it is the height of the soil-pipes and the weight of the water which is now passed through them through the modern water-closet and other appliances which draws the air out of the traps. A specification must be written for separate trades, because the workmen themselves are still artificers in separate trades. They may be all employed by one contractor, but they invariably have foremen of their own, and it is the foremen of the separate trades who most carefully read the specification. Though the architect has to write the specification in trades, he must write it as a whole. I have endeavored, in going through the terms which I find are the most difficult of interpretation, not to give my own opinion in any way, and, if my paper is of any service, it will be by calling the attention of those who are learning to write a specification to the points that they have to attend to.

BUILDING LAW

THE STANDARD CONTRACT.

PROVIDENCE, R. I., March 19, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In the Law Department of the *American Architect* for March 16, 1889, I find the following remarks in regard to Mr. Hatfield's quotation from Professor Parson's "*Laws of Business*":

"Our correspondent invokes the authority of Professor Parsons in support of the architect's unlimited agency, and quotes a provision from a form said to be contained in his "*Laws of Business*," making the architect the agent of the owner for the purpose of superintending the work. . . . Moreover, the book referred to contains no such contract, or any form of building contract whatever. Perhaps Mr. Hatfield's friend had some English book in mind."

I am the friend to whom Mr. Hatfield refers, and, notwithstanding the denial of your legal authority that it contains "no such contract, or any form of building contract," I will say that in "*Laws of Business for all the States of the Union, with Forms and Directions for all Transactions*," by Theophilus Parsons, LL.D., etc., etc., Hartford, Conn., published by S. S. Scranton & Co.; Philadelphia, Pa.: Parmelee & Co.; San Francisco, Cal.: H. H. Bancroft & Co., 1869, on page 74, Form 23, in "A Full and Minute Building Contract," are found the words: "And under the superintendence and direction of ——, hereby appointed *superintendent* and *agent* of the party of the second part." These words were quoted substantially by Mr. Hatfield from information furnished by me.

I wish to add that Professor Parsons, in the statement preceding Form 23, says: "I now give a very full and minute form, prepared by a skilful lawyer, and in wide use."

Yours truly,

ALFRED STONE.

[In reply to the above communication, we can only say that the edition of Parsons's "*Laws of Business*" published in 1860 by Little & Brown, Boston, contains no form of building contract. In the edition of 1879, however, published by S. S. Scranton & Co., of Hartford, Conn., there is a form, No. 23, on page 66. This form contains the clause to which our correspondent refers, but, as pointed out in our issue of March 16, the agency of the architect does not include the authority to order extras. If our correspondent had read a little farther into this form of contract, he would have run across the following:

"It being expressly understood that no extra work of any kind shall be performed, or extra materials furnished, by the said party of the first part (the contractor) unless authorized by the said party of the second part (the owner) and the superintendents (the architect) in writing," etc.

It is indeed common in building contracts to make the architect the owner's agent in respect to superintending the work. This practice is not particularly objectionable; considerable experience in trying building cases has satisfied us, however, that such a clause is unnecessary for the owner's protection, and renders it more difficult for him to hold the contractor to a strict compliance with the terms of the contract. But whatever authority may be given to the architect to represent the owner as his agent in the work of superintendence *would not include the right to order extras*; and it will be observed that the "skilful lawyer" who prepared the form in "*Parsons*" was extremely careful that no such authority should be given by implication even, and went to the length of inserting the express provision quoted above that no extras should be ordered without the consent of the owner in writing. We recommend a careful attention to this and the other provisions of the "skilful lawyer's" form before adopting the "standard form."

The main objection to the "standard form," we again repeat, is the attempt to give the architect unrestricted and irrevocable power to order extras. We do not believe that any lawyer in the United States, skilful or unskilful, can be found to sanction such a practice. — ED.]

SOCIETIES

T-SQUARE CLUB.

AT the regular meeting of the T-Square Club held on the 6th inst., at Philadelphia, Pa., action was taken upon the death of Mr. J. Howard Sprunance, after which drawings submitted by members (at Mr. Wilson Eyre's studio) for hardware on club-house door drawn three-fourth inch to the foot, and full-size details were criticised with the following result: First mentioned, Louis Hickman; second, Arthur Truscott; third, Frank A. Hays. The meeting concluded with a collation.

COMMUNICATIONS

PAYMENT FOR UNEXECUTED PLANS.

March 25, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Can you refer me to any adjudicated cases touching upon an architect's right to be paid for plans and specifications for buildings not carried out. I have found it necessary to sue for pay for such services and beg you to send me references at once.

Very truly yours, VITRUVIUS.

[THERE is no question about the right of an architect to payment for plans and specifications for buildings not carried out, provided he was asked to make the plans and specifications, and did not agree not to ask for any pay unless they were carried into execution. If he can satisfy the jury on these points, it is difficult to see how he can be prevented from obtaining judgment for a proper compensation for his work. What the proper compensation will be, depends again on what the jury is satisfied that the agreement was. If he had been engaged for full professional service, he is entitled to damages for being prevented from completing his service, in addition to payment for what he actually did. Messrs. Fuller & Wheeler of Albany, had a case of this kind decided in their favor by a referee, which was described in this journal some time ago. On the general question, perhaps, Lord *vs.* Nourry and Kuntz *vs.* Pelby, 20 Pick. 65, may be of some use, but the matter really rests upon what the jury, or the referee, may find that the contract was. If they find that the defendant, either expressly or by implication, asked the plaintiff to do work for him, which the plaintiff did, in a proper and skilful manner, expecting to be paid, and without agreeing to any conditional terms of payment, it will be very strange if they do not award him a fair compensation. As to what constitutes a fair compensation under the circumstances, the schedule of the American Institute of Architects, which regards three and one-half per cent

on the proposed cost as the proper fee for plans and specifications for buildings of the value of not less than ten thousand dollars, which are not carried out, may perhaps be admitted as evidence. If not, individual architects can be called upon to testify on that point. — Eds. American Architect.]

NOTES AND CLIPPINGS

A New French Fine Arts Commission. — One of the last alterations effected by M. Lockroy as Minister of Public Instruction and Fine Arts was in connection with the Department of Fine Arts. For many years all business between the State and artists was conducted by the officials of the Department. In 1884 an independent committee was appointed, but its powers were limited. M. Lockroy proposed, and the President has approved, an enlargement of the committee and an increase of its responsibility. First, there is a general commission consisting of the chief officers of the Department of Fine Arts, several senators, deputies, amateurs and artists. Among the last are MM. Bailly, Garnier and Ditterre, architects; M. Puvis de Chavannes, painter; MM. Chapu and Dalou, sculptors; and MM. Chaplain and Braquemont, engravers. The commission will examine all projects of decoration of public buildings, will give advice on competitions, and point out works in exhibitions which are worthy to be purchased by the State. By the new arrangement it is anticipated that more unity will be obtained than was possible when commissions were given without any thought of other works. In order that delays may not arise through the difficulty of bringing so many members together, a sub-commission with fewer representatives has been nominated, before whom questions will be brought in the first place. It is expected that artists will be more in accord with a commission so constituted than with one made up of officials, whose business, everywhere, is to create difficulties. — *The Architect.*

Castings from Bronze. — It is said that Sir Richard Wallace has refused the offer of some thousands of pounds for permission to take a cast of the shield by Benvenuto Cellini, which is one of the treasures of the gallery in Manchester Square. Naturally there is apprehension that some injury to the shield might arise in the course of the process. Sir Richard Wallace's views will be confirmed when he reads how the architect who has charge of the column which marks the site of the Bastille has declined to grant permission for a cast to be made from the bronze lion which is sculptured on the west face of the pedestal. It is one of Barye's works, and the cast is required to complete the collection of French sculpture produced during the century which is to form a part of the international exhibition. The architect says that part of the plaster might remain and fill up some of the numerous recesses of the tooling, which would lose their character. He is also uncertain about the chemical action of the plaster, which might remove the patina, or in any case affect the color of the bronze. There is some disappointment at the resolution, which is a condemnation of the action of other architects and conservators who have raised no difficulties about castings. It would be bad news for many museums if the architect's opinion prevailed. That moulding has not become more dangerous to bronze in Paris than elsewhere is evident from the experience of the process lately in the Louvre, casts having been taken of many delicate bronze statuettes without any injury to the originals. A special exhibition of Barye's works, for the purpose of obtaining money to erect a statue of the sculptor will be opened in Paris on May 1 in the galleries attached to the Ecole des Beaux-Arts. — *The Architect.*

The Efflorescence on Brickwork. — The unsightly efflorescence on walls, due to what is termed "saltpetring," and noticed generally in dry weather, is due to several causes. Perhaps the only satisfactory explanation is that the newly-built brick wall is exposed to dampness, or dampness in coöperation with something in the bricks themselves. It is stated that bricks made from clay containing iron pyrites are subject to this efflorescence; that the sulphur from the fuel converts the lime or magnesia into sulphates, and that whenever the bricks dry the sulphates evaporate, leaving behind the crystalline appearance or efflorescence. The evil is, therefore, due to the chemical action that takes place between the sulphur in the fuel and the magnesia in the clay. The mischievous part of the efflorescence is that it destroys the pointing, and injures the work generally. Remedies are few. The chief object is to stop up the pores with some solution of fatty matter, quicklime and cement powder; but the main thing is to avoid the particular clay and coal fires employed to make and burn the bricks, and to mix the mortar with animal fat. — *Building News.*

Old Monastery Doors. — Derbyshire possesses what are described as the finest pair of old monastic doors in England. The great doors, wicket doorways and spy-hole, of the Carthusian priory of Beauvale, Notts, have long lain neglected at Melbourne Hall, being brought there when the old gate-house was pulled down in the last century. The present tenant of the hall, Mr. Paine, has placed them under cover. They are in fair condition, the oak bolted through with great clout nails and are carved in panels, with intersecting tracery above. The date seems to be about 1350–1380. Mr. Paine has lately brought to light among the Cole papers the original voluminous charter, with great seal attached, granting the lands of the dissolved priory of Beauvale. — *Exchange.*

The Outlet of Roofing-Slate. — The following is a statement of the shipments of roofing-slates from different points in the country during the year 1888: Bangor and Pen Argyle, Penn., 378,800 squares; Slatington Section, Penn., 114,000; Chapman's, Penn., 24,500; Peach Bottom, Penn., 23,000; Maine, 38,000; Vermont and New York, 159,000; Virginia, 10,000; making a total of 650,300 squares, as against 645,000 squares in 1887. — *Bangor Courier.*

TRADE SURVEY

The characteristic of the general markets of the country is dulness. The depression was not anticipated. Coming unexpectedly as it did, business interests look for its sudden disappearance. Wages have been reduced 5 to 15 per cent in a number of industries. A few thousand mechanics have been disemployed. A number of schemes that were to have been pushed this month are delayed, and promoters are disposed to move with unusual caution. What is the actual strength of the trade situation is asked. Is production excessive? Are prices declining? Are opportunities for investment dying out? Has enterprise less chance this year than last? Are our finances, as a nation, in good condition? Is mortgage indebtedness increasing? Are railroad managers approaching harmony? These and a dozen other queries arise among practical business men, and most of them remain unanswered. There is but little in the stock-jobbing reports to enlighten business enterprise. Commercial men of long experience, arguing from the past, cling to the opinion that the year's business will round up grandly. The fact standing out boldly in the business world is that productive capacity has been very greatly increased in all departments of activity. Can this increased capacity be profitably employed is what the business world is now asking? In iron and steel prices are still weak. So also in coal, though a bituminous operators' compact has been effected to preserve prices 20 to 30 cents above competitive limits. In some Western States miners' wages will be reduced 12 per cent. In some iron mills wages are down 10 per cent. At the Altoona railroad-shops 4,000 men have been reduced to nine hours a day, with a half Saturday holiday, and no reduction in pay. The eight-hour agitation is progressing, and employers are observing it with interest. Railroad bridge-work is coming in freely. Three large bridge-works are now turning out material for forty bridges on the Chesapeake & Ohio Road. The Norfolk and Western Company are also large buyers of iron for bridges. Three bridges are to be built near Pittsburgh. The expanding bridge-building demand is stimulating enterprise in the West to erect large structural-iron establishments. American locomotive engines are in demand in Central and South America; and a leading builder stated this week that American work in those localities would be doubled within a few months. Within a short time twenty-one engines have been shipped there. Car-work comes in slowly, but from excellent authorities it is learned that much work will be placed among builders during the next sixty days. Railroad managers are not inclined to contract for work hastily. Despite all the complaints over dragging railroad-building enterprise, much new work has been projected since March 1. A road is to be built to parallel the Duluth and Winnipeg, now building. Ore roads in the Lake Superior region are to be hurried through. Several lumber roads will soon be heard of. A ninety-five-mile road is to connect Baton Rouge and the Mississippi River. A road is to be built from New Orleans to the Pacific Coast *via* Dallas. Within thirty days forty roads have been projected; most of them needed to satisfy existing traffic requirements. Among the sensational foreign rumors is one to the effect that the English colleries in Cumberland, Yorkshire, Lancashire, Northumberland and Durham are to be purchased by a syndicate representing five hundred million dollars. Grand railway schemes are coming to the front in Mexico, pushed by foreign capital and assisted by American enterprise.

The Cuban iron-ore developments are very encouraging to the Americans that are extending their control of mineral properties in that island. Natural gas is to be piped to Columbus, Ohio, from a rich gas territory twenty-five miles distant. Wells have been bored in Kentucky, developing large gas supplies, and schemes to pipe gas are up for consideration. Western mining interests are seeking legislative coöperation to erect dams across mountain gorges to accumulate such a supply of water as will aid mining and smelting operations in dry weather. This is an important move, and in some respects is more important than even irrigation. A deep exploration-shaft is to be sunk at Leadville by interested parties to determine the existence of valuable minerals at lower depths. One of the finest ore-beds on the continent have been found 225 miles north of Denver. It is said to average 67 to 72 per cent metallic iron. They are low in ordinary impurities. The ore can be mined at fifty cents, and delivered at Denver at $2. Coal and iron companies are springing up in the South. Competitive influences are equalizing economic advantages, and industries are slipping from one place to another every week. The week's reports from architects and builders strengthen previous statements as to the probable volume of work. While manufacturing capacity has been greatly increased, manufacturers are preparing to increase it further. Textile manufacturers do not hold back. An authority on hosiery production states that as many as twenty factories will be erected this year. A manufacturer of shoe-making machinery states that orders for machinery are numerous. The wood-working machinery-makers will endeavor to form a national combination to fix prices. The numerous small manufacturing combinations are all renewing their mutual vows of constancy for the coming season. Building material is low, but lumber may not drop any on account of the short log-cut. Western cities are inclined to buy brick for paving purposes. Lincoln, Neb., will have seven miles of brick-paved streets. At Des Moines, a mile and one-half have been laid. Glass of all kinds will be in abundant supply. All the factories are working. Real estate speculation is more active, especially in large cities, and a great deal of property has been purchased this winter by parties who recognize the upward tendency in city real estate. As facilities for rapid transit improve, land seems to appreciate in cities for manufacturing purposes. Extensive purchases have been made for building requirements in New England towns and in the Middle States. Shop-building enterprise is most active. The building trades threaten no disturbance generally this year. Wages are acceptable, but a movement for an eight-hour day is being agitated in nearly all the larger cities. Foreign workmen are taking more interest in this phase of agitation than Americans. The banks are exercising greater caution in extending loans, especially to new customers and outside parties. The surplus reserve in New York is near eight million dollars. Bankers have confidence in the general solvency of the country, but there is a feeling that greater care must be exerted in the future in the extension of credit. There is considerable extended manufacturing paper being carried, and bankers are anticipating a greater demand as the season progresses on their resources. Business will probably swell to larger proportions within the next week or two, but manufacturers, jobbers, retailers, and all interests feel the necessity of keeping within prescribed limits. It is not over-production that is feared, as the trade combinations have shown their ability to deal with that phase of the question, but a decreased consuming capacity. But this is a danger that need not be defined until it approaches closer than it is at present.

S. J. Parkhill & Co., Printers, Boston.

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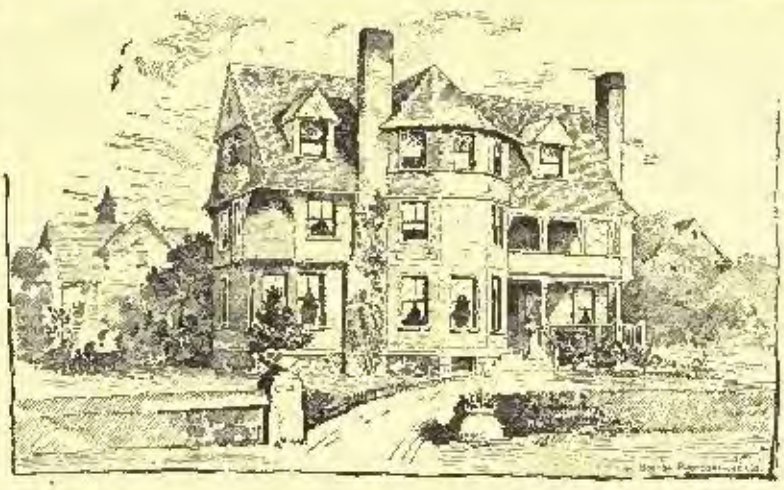

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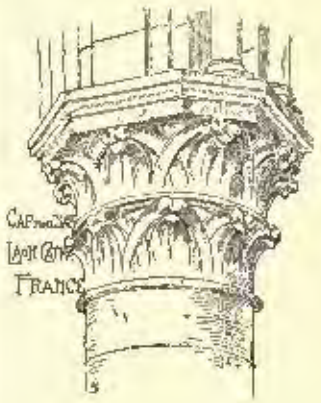

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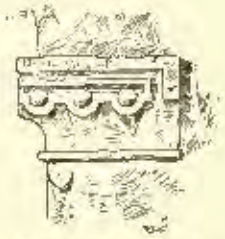

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CAPITALS.

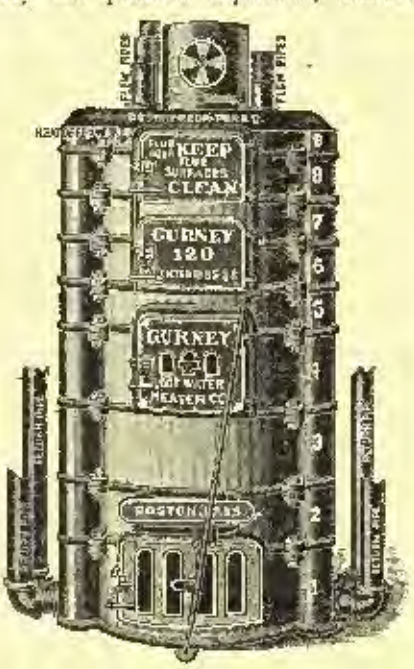
THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 81. SATURDAY, MARCH 2, 1889. VOLUME XXV, No. 688.

THE GURNEY HOT-WATER HEATER.

Below we append cut of the one hundred series of the Gurney Improved Hot-Water Heater, which is the production of years of study and practical experience, combined



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The Gurney Hot-Water Heater Company are undoubtedly the pioneers of hot-water heating in this country, and have at all times had uppermost in their minds the ambition to perfection, and for the public good. To be outdone by none, and thus always hold the lead. And to the eye of the practical engineer we think this article and cuts will commend themselves.

In beauty of form, durability of construction, compactness, extent and quality of surface, cheapness, and economy, they have obtained the best results ever secured, and they challenge examination and comment by the engineering talent of the world.

The main considerations to be regarded in a Hot-Water Heater are how to arrange the heating surfaces to obtain the best results and this can only be determined by continued experiments, and the Gurney Hot-Water Heater Company having made in the past several years series of practical experiments, are led to lay down the following essentials for the construction of a satisfactory Hot-Water Heater:

1. The whole arrangement must be such that the least possible resistance is offered to free circulation.

2. The area of heating-surface must be made to approach, so far as practicable, a maximum.

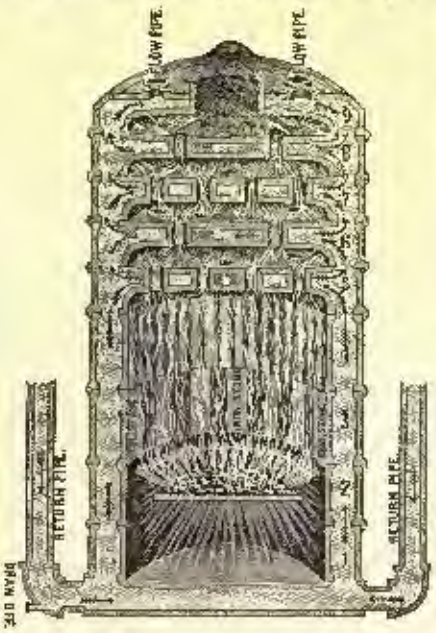
3. The arrangement of the heating surface must be such that,

(*a*) A maximum of the heat of the burning fuel is utilized.

(*b*) The convection currents shall not impede each other, or coalesce to the formation of eddies.

How far we have met these essentials of a good heater in the construction of our one hundred series of Heaters will be best understood by referring to the accompanying cuts.

To meet the first essential, we have constructed the heater so that the inlet and exit ports are open from the line of the floor to the top of the heater, as well as around the entire circumference of the cross-sections. All sharp angles and other obstructions to general circulation have been avoided. The second essential is secured by the introduction, in series, of a number of sections, pierced with flues, through which the heated products of combustion require to pass before entering the chimney. The area of heating-surface is thus greatly extended, and essential three (*a*) met at the same time, since the heated gases (products of combustion) part with their heat as they ascend through the different sections. The essential three (*b*) we have sought to



meet by giving the sections a peculiar shape. The upper and lower plates of each section incline from the ports inwards, giving the outgoing and incoming currents such direction as (in our belief) will most effectually prevent the formation of eddies, and in general, produce currents which may accommodate themselves with the least resistance to the direction of the main currents in the outer jacket.

The Gurney Hot-Water Heater is especially designed and adapted for hot-water heating. It is easy to erect, most economical of fuel, simple to manage, presents the largest heating-surface to the fire, is moderate in cost, and we offer them to our patrons fully guaranteed.

To correspondents living at a distance we would recommend a conference with local fitters with a view of obtaining estimates of fitting, and they would be glad to furnish plans which, if adhered to, will result in giving a thoroughly reliable heating apparatus. Correspondents, when soliciting estimates of work, will have the kindness to be as explicit and definite as possible as to the size of the building to be warmed, its glass surface, construction, location, points of compass, exposure, and conditions generally. A sketch of the building, with its size and height of ceiling, will facilitate matters and enable them to form a correct idea as to size of apparatus needed.

GURNEY HOT-WATER HEATER COMPANY,
BOSTON, MASS.

ASPINALL'S ENAMELS.

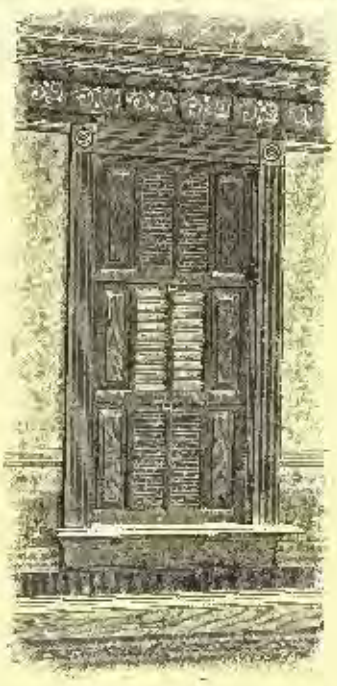
For years past many scientific men have endeavored to produce an enamel, that will stand boiling-water, something especially adapted to renovating baths, that have become unsightly, and the success which has crowned the efforts of Aspinall & Co., England, in the production of their various enamels has been hailed with delight by the civilized world. This product is the only real enamel which does stand boiling-water and is made by a secret process known only to themselves. It is not a *paint*, but is applied as easily and readily as any mixed paint, to iron, tin, wood, or any other substance, however open or porous, and its uses are so manifold as to make it impossible to enumerate them. Old bath-tubs, baskets, tables, chairs, hot-water cans, brackets, bedsteads, etc., can be easily and quickly rejuvenated or decorated with any color desired, over a hundred different colors or shades being manufactured from chalk white to deepest brown and black. For prices, list of colors, testimonials and further information apply to,

E. ASPINALL,
Sole agent for the United States,
98 and 100 BEEKMAN STREET, NEW YORK, N. Y.

The Whittier Machine Company have recently constructed for Messrs. Tiffany & Company, Union Square, New York, one hydraulic passenger elevator operated by their Pressure Tank System.

THE "WILLER" SLIDING-BLINDS.

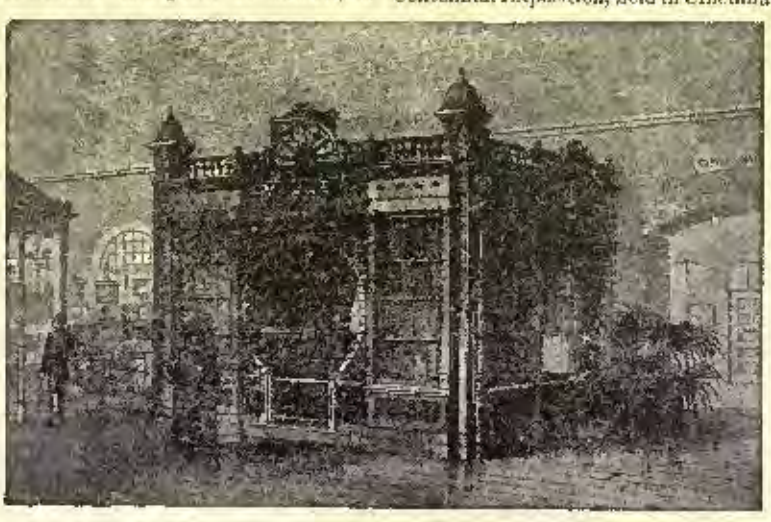
The "Willer" sliding-blinds have been in the market but a few years, but in that short period they have become so generally known amongst architects, builders, and the building public in general that a detailed description of them is here unnecessary. The catalogue shows some twenty different classes, or twenty distinctly different ways of arranging these blinds in the windows. For illustration we select Class E, this class being universally used for buildings of medium cost,



on account of its simple construction and moderate price. This class consists of three separate sections of blinds, covering the entire window, and running in a guideway containing three grooves, one for each section of blind, all within the space of the window-opening, no pockets being employed at either the bottom or top of the window.

The other classes in the catalogue show windows fitted with blinds of two, four and six sections, without pockets, and with pockets at either the bottom, top, or both ends of the window.

The "Willer" blinds have rolling slats of a new construction throughout all sections, or



in as many divisions of the blinds as may be desired; the springs are of the latest pattern, and the only springs adapted to hold the blinds in place. The blinds are handsomely trimmed with full sets of hardware, finger-plates, drop-handles and lifts, in Berlin or genuine bronze. Each set of blinds is finished complete, varnished, rubbed, and polished as desired, and when fitted to the window is ready for use.

The "Willer" blinds, on account of their superior quality and merit, and their adaptability to windows of every description, have

been selected in preference to all others, and accorded the first rank in all parts of the country. They are now being placed in the residence of the widow of the late Emil Schandein, Vice-President of the Philip Best Brewing Company of Milwaukee, erected at a cost of over $300,000. Mr. Schandein had examined all forms of inside-blinds, and had given these the preference over all others.

A public school-house in Denver, Col., has

lately been fitted with these blinds, the total order for the purpose amounting to nearly $6,000.

As a further proof of the superior quality of these blinds over all others, the firm has been awarded the bronze medal at the late Centennial Exposition, held in Cincinnati, July to November, 1888. This bronze medal is the *highest* and the *only* award made to any exhibitor of sliding-blinds, and, although there were others on exhibition, none of these have received any award, diploma, or medal whatever. In their report, the jury said: "awarded on account of excellent workmanship," etc. We print herewith an illustration of the Willer exhibit at the above Exposition, taken from a photograph; also a fac-simile of the medal.

We employ a force of one hundred and fifty men, of whom one hundred and ten are employed exclusively in the manufacture of these blinds. The sales of these blinds for 1888 amount to over $100,000. The blinds are in use in all parts of the country from Maine to California, and Manitoba to Texas. Over $10,000 worth have been sold in Canada alone.

We will send our No. 8 Catalogue of 1888, free of charge, to any architect or builder, etc., upon application. Our new catalogue of 1889–1890 will be issued about May, 1889, and will be the most artistic and complete catalogue of its kind in the country.

We also make a specialty of fine stair-work, of which line a separate catalogue will be issued in the spring.

The firm is represented at present by nearly three hundred sales-agents in all parts of the country. Agents are wanted everywhere, and applications for agency will be considered from parts not yet represented.

Further particulars may be had by addressing the firm,

WILLIAM WILLER,
Fourth and Cedar Streets, Milwaukee, Wis.

THE SPRINGFIELD GAS-MACHINE.

The Springfield Gas-Machine has been perfected by an experience of over twenty years. As it has from the first been made of the most durable material and most perfect workmanship, no doubt there are more of these machines in actual operation to-day than of all others combined. Thousands of other machines, which have been made of inferior material, are now out of use, because they have been destroyed by corrosion, often within three or four years after being set up.

Our air-pumps are constructed entirely of copper. Our gas-generators are of heavy galvanized-iron, with every seam not only riveted like a steam-boiler, but massed in solder, so that the cut edges of the iron and the exposed ends of the rivets are completely plated with that metal. They are then covered with boiling tar in several coats. They are divided into shallow evaporating-pans, furnishing by this means, and by abundant absorbent material, larger evaporating surface in square feet than any other gas-generator made.

We confidently assert that this is the largest, most durable, simple and efficient gas-machine in the world.

The gas made by these machines is usually know as Carbureted Air Gas, being common air impregnated with the carbonaceous vapors of gasolene. It burns with a rich, bright flame, fully equal to coal-gas, and it is conducted through pipes and ornamental fixtures with the same convenience and safety.

The gas is really analogous to coal-gas in its general features — the one being a carbureted air gas, the other a carbureted-hydrogen gas. They are both governed by the same general laws; the particles of each exist in a state of mutual repellancy; if permitted to escape, they alike permeate all the surrounding atmosphere, and are detected with equal readiness by their odor. Air gas possesses an illuminating power of from twenty to thirty candles, equal to the best coal-gas, and much superior to that ordinarily supplied by city gas-companies. It is a remarkably pure gas; contains no sulphurous compounds or impurities of any kind; with proper burners, combustion is perfect, without smoke or odor.

Gasolene, the fluid used in making gas by our apparatus, is a light, volatile product of petroleum, analogous to kerosene; chemically considered, it is almost a pure carbon; it is produced in large quantities in the distillation of petroleum, and is a common article of merchandise, readily obtained from almost all refiners or dealers in oils. The supply yearly increases, more than keeping pace with the demand, and is necessarily as inexhaustible as the supply of petroleum.

The Springfield Gas-Machine consists of a gas-generator—a cylinder containing evaporating-pans or chambers—and an automatic air-forcing apparatus.

When the machine is in operation the pump forces a current of air through the gas-generator; here it becomes carbureted, thus forming an illuminating gas that is returned through the gas-pipe to the house, and carried by the distributing pipes in the walls and floors of the building to the burners, or it may be conducted from the gas-generator to other houses in any other direction—to stables, out-buildings, or to lamps on the grounds, wherever light is required. This plan of gas-making is automatic. Gas is generated only as fast and in such quantities as required for immediate consumption. The process is continuous while the burners are in use, but instantly stops when the lights are extinguished. The Springfield Machine, set in this manner, is considered as safe a means of lighting as any that can be adopted; all the gasoline is kept in an air-tight vessel under ground, and removed from the building a safe distance. There is no gas in the air-pump, nor inflammable material in the building, except the gas contained in the distributing pipes.

No fire is used in the process of manufacture buildings lighted by the gas are insured at the same rates as though coal gas were used.

We have now several thousand machines in use in every part of the country, lighting all classes of buildings, and in no case has a building been burned.

The cost of the gas depends upon the price of gasolene; this varies from fifteen to twenty cents per gallon. Taking this as a basis, the cost per thousand feet is from eighty cents to a dollar, six gallons being a liberal estimate of the amount of fluid required to produce light equal to that from a thousand feet of ordinary coal-gas.

The economy of lighting by gasolene gas has induced many large consumers of coal-gas to adopt our machine, and with the most gratifying results, the cost of the apparatus being quickly saved in the lessened gas bills.

Air gas is cheaper fuel than coal or wood for cooking and laundry purposes. Send for our illustrated catalogue of gas ovens, ranges, griddles, grills and broilers, laundry-iron heaters, coffee-roasters, instantaneous water-heaters and open fireplace heaters.

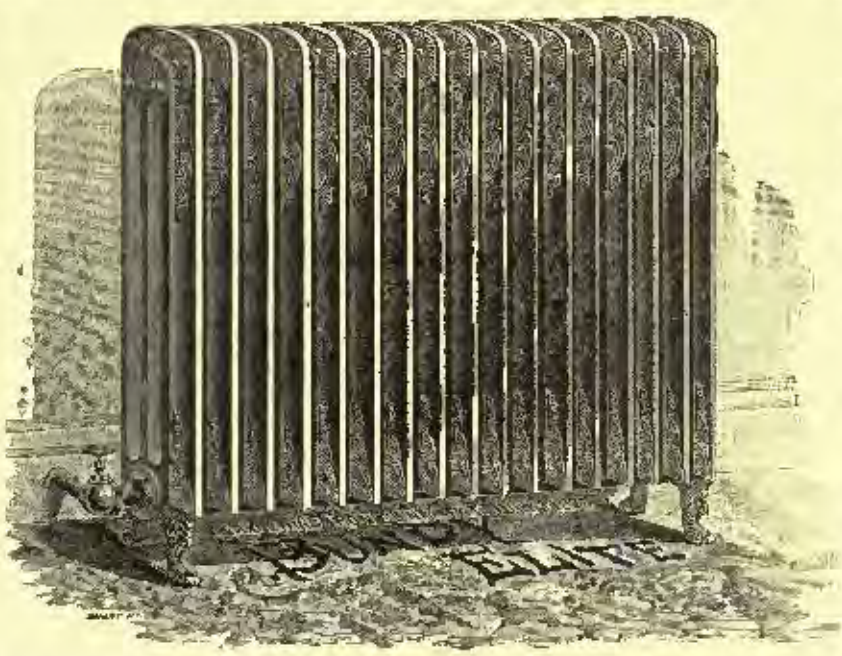
One of the most interesting uses to which gas may be put in promoting domestic comfort is undoubtedly that in connection with the preparation of food. It is a matter of surprise that it has not been much more extensively adopted by the general public. Its use for these purposes is of special interest to those having gas-machines, because of the great economy of air gas. The first cost of gas ranges is not half that of good coal ranges, while they will last a lifetime. The exact degree of heat required for any special purpose is at once obtained. Since combustion is perfect, there is no smoke or odor, and no flue is required. On the score of economy, it will be at once acknowledged, after trial, that the cost of a coal fire doing the same amount of work is greater than the cost of gas, while the certainty of its results, its cleanliness, convenience and comfort, are obviously in favor of the latter fuel. Any coal stove may be fitted with a burner suitable for burning air gas, without smoke or odor.

Ordinary open coal grates furnished with a suitable burner, and filled with ragged bits of lava, which, when the gas is lighted, become incandescent, perfectly counterfeit a coal fire, and furnish an economical and abundant heat.

Air gas is used as fuel in the mechanical arts for heating light forgings; melting gold, silver, brass, glass, etc., soldering, brazing, bluing; in canneries, and by manufacturers of hollow ware. We invite correspondence on this branch of the subject, and will mail our circular, with numerous references, upon application.

GILBERT & BARKER M'F'G. CO.,
75 MAIDEN LANE, NEW YORK, N. Y.

A RADIATOR WITH ARABESQUE DESIGN.



Our illustration shows the Bundy "Elite" Radiator which has the most beautiful design that has ever been applied to a radiator.

It is of Moorish origin and consists of only lines, curves and angles as the superstitious Moors thought it an unpardonable offence to fashion any artificial object like anything having life. The Koran taught them that the imitated object would immediately die and bring down upon the offender the curse of their God. In this the over-careful Moors were certainly foolish, but at the same time, a study of their architecture shows their skill in designing works of rare beauty.

It is especially appropriate in ironwork where any attempt to imitate life seems out of place, inappropriate and in time, absolutely unbearable.

For this reason the Elite Radiator, which has the Arabesque design in its purest type, is the most beautiful that has ever been applied to a radiator. The appearance of the radiator is such that no one ever grows tired of it and it can be decorated in a multitude of ways to suit the surrounding draperies, etc.

Also, unlike all other sectional radiators made, this has a sectional base with its accompanying advantages, and this is why all prominent architects, with rare exceptions, specify the Bundy Elite Radiator, because they find that they can use from ten to forty per cent less radiation than with any other.

Steam-fitters are also cognizant of this fact and when the matter is left with them for decision as to which radiator to use, and they intend to conscientiously serve the best interests of their clients, they will use none other.

It also possesses a great advantage over all other radiators from the fact that the surface consists principally of arcs of a parabolic curve, and so all parts of the radiator are constantly surrounded by freely circulating air. Again, all sections are duplicates; legs are detachable and can be placed under any section and if desirable sections can be added to, or taken from, the radiator increasing or diminishing its heating powers at will.

Much more might be said regarding this excellent radiator, but it will suffice to say that we will gladly send our catalogue, which is a veritable encyclopedia on heating, to any one who may request it.

THE A. A. GRIFFING IRON CO.,
782 COMMUNIPAW AVENUE, JERSEY CITY, N. J.

FIREPROOF BUILDING MATERIALS.

The practicability and efficiency of Hollow Burnt Clay Blocks and Tiles and Porous Terra-Cotta Material in the construction and protection of buildings against loss by fire, has been fully and satisfactorily demonstrated, and the security it offers is so palpable, that the best informed architects and builders in the country recommend its use in all structures where life and property is jeopardized.

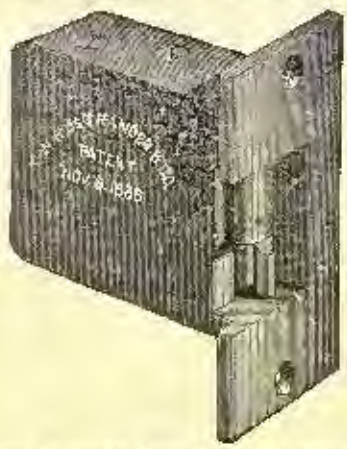
Since this important feature in buildings has become an established fact—the demand for "Hollow Brick" has increased largely, so much so that within the past year we have been obliged to greatly exceed our former capacity in order to meet the requirements of this important branch of industry. Our works are now the most extensive of the kind in the country.

The advantages we possess for procuring and handling the raw material are unsurpassed, having our own clay beds easy of access within a few feet of our works—situated on the Sound at Maurer's, near Perth Amboy and Woodbridge, N. J., with railroad switches alongside, an extensive water-frontage, and large dock-room, which gives us every facility necessary for shipments to all points reached by rail or water. We are prepared to furnish estimates and execute promptly all contracts intrusted to our care. Correspondence solicited and any information

furnished on application. A new descriptive and illustrated catalogue of especial value to architects and those contemplating building, now ready and will be mailed free by addressing,

HENRY MAURER & SON,
422 East 22d Street, New York City, N. Y.

THE OSTRANDER DOOR-OPENER.



The Ostrander Door-Opener is simple and compact in construction, positive in operation, and withstands wind pressure or other force, and cannot be jarred open.

The movable bolt is a steel drop forging, and the other parts are of the best wrought-iron and steel. Nothing has been spared in its construction, as our aim is to make this *the* Door-Opener.

These have been thoroughly tested and in practical operation since patent was applied for.

The movement is a gravity one and it is devoid of any delicate springs or delicate mechanism.

The movement is protected by metal sides to prevent dirt, plaster and chips from interfering with its operation.

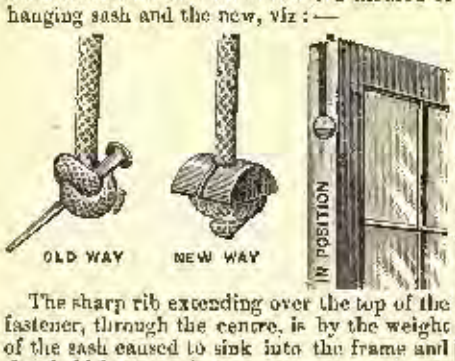
This Door-Opener is operated by compressed air (Pneumatic) or by electricity with batteries; and orders must state which method is to be used to operate the Door-Opener, and also state if for right-hand or left-hand doors.

W. R. OSTRANDER & CO.,
21, 23 & 25 Ann Street, New York, N. Y.

THE NEW SASH-CORD FASTENER.

The success of house-building and the satisfaction of living in it, when built, depends, very largely, upon the little and unseen contrivances which perfect the working and use of the details. This is no more apparent than in the hanging of the window-sash, which too often, is done in such a slip-shod and careless manner as to call forth the imprecation of all who have to do with them. Especially if the sash has to be removed from the frame for cleaning or other purposes.

The Empire Portable Forge Company of Cohoes, N. J., realizing, from actual experience in building, this deficiency, have put on the market a new sash-cord fastener (see advertisement in another column) which is designed to do away entirely with the difficulties to a cheap and effective way. The illustration herewith shows the old method of hanging sash and the new, viz:—



The sharp rib extending over the top of the fastener, through the centre, is by the weight of the sash caused to sink into the frame and thus held from moving.

Reasons why you should use them:

It costs less than one-and-one-half cents per sash. Requires no nails or screws. Can be put in or taken out in less than one minute. Prevents the knot from fraying out and getting between the sash and frame. Does not split the sash like nails or screws. Prevents the cord from running back into the weight pocket. The most useful invention for window sash ever put on the market. Every window requires them.

The Empire Sash-Cord Fastener is the most useful little thing ever offered for easily attaching cords to the sash—costing a mere trifle—at same time saving much time and patience in hanging the sash and preventing damage to it by the use of nails or screws through the knot, as in the old method, and wearing and binding of the sash and frame by the knot fraying out and becoming jammed between them.

It also prevents losing the cord in the weight-pocket by running backward, and when the sash is to be removed for cleaning or glazing, it can be done so easily and so easily replaced that any man building a house will have them, and the work will be much more satisfactory.

The Empire Forge Company call the attention of architects, especially, to this little device and urge them to include the sash-cord fastener in their specifications. We will be glad to send a sample of it with cord attached to a block, showing both the old and new methods, on receipt of a postal-card request.

Investigation of this little device, will show it to be a very useful one and destined to have a large sale.

EMPIRE PORTABLE FORGE COMPANY,
Cohoes, N. Y.

NOTES.

The Whittier Machine Company have recently put into the Adams Building on Court Street, this city, two hydraulic passenger elevators, each operated by their Pressure Tank System. Also have constructed for Messrs. R. & O. Goelet for the building corner of Lexington Avenue and 41st Street, New York, a steam elevator for freight and passenger service.

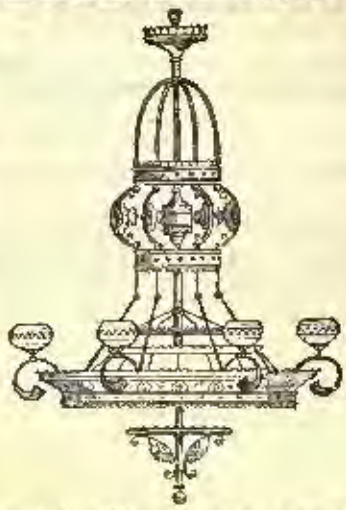
They have recently constructed for Dr. John Walters, No. 1010 F Street, N. W., Washington, D. C., two upright steel boilers, each two and a half feet in diameter.

We understand that the Henry-Bonnard Bronze Co., New York, have contracted to cast in bronze the following statues, on which they are now engaged.

Statue of Dr. Gallaudet, for Washington, by D. C. French, sculptor, N. Y. Statue of General Stannard, for Gettysburg, by Karl Gerhardt, sculptor. Statues of soldier and sailor, for monument at Newport, R. I., by W. Clarke Noble, sculptor. Statue of Governor Hubbard, for Hartford, by Karl Gerhardt, sculptor. Statue of soldier called "Appamatox," for Alexandria, Va., by C. Buberl, sculptor. Two soldiers for Gettysburg, for Frederick & Field, Quincy, Mass., S. J. O'Kelley, sculptor. Statue of Theodore Parker, for Boston, by Robert Kraus, sculptor. They are also casting the bronze rail for the United States Trust Co., Wall Street, R. W. Gibson, architect.

Mr. I. P. Frink of 551 Pearl Street, New York, of patent reflector fame, whose reflectors are extensively used with gas, oil, electric, and day light, has orders now on hand covering a great variety of buildings; among which are, Eliot Street Congregational Church, Newton, Mass.; St. George's Church, Astoria, N. Y.; Baptist Church, Bristol, Conn.; Tabernacle Baptist Church, Brooklyn, N. Y.; Centenary M. E. Church, Jacksonville, Ill.; Pilgrim Congregational Church, Duluth, Minn.; Garland Street M. E. Church, Flint, Mich.; Free Reformed Church, Jersey City, N. J.; First Presbyterian Church, Englewood, N. J.; Cumberland Presbyterian Church, Murfreesboro, Tenn.; The Court-House at Las Animas, Colo.; The Town Hall at Wickford, R. I.; The Assembly Rooms of the School Buildings at Mechanicsville, N. Y., and Galveston, Texas.; The Art Galleries of David C. Lyall, Brooklyn, N. Y.; W. H. Hogencamp, Patterson, N. J.; Chatelet Club, Newark, N. J.; Opera House, Wilkes-Barre, Penn., and Paris, Mo.; Retail Carpet Department, Arnold, Constable & Co., New York, and Heath & Drake, Newark, N. J.

FRINK'S Reflectors



Are used with oil, gas, electric or day light. Strongly endorsed by the leading Architects, and are in use in most of the prominent Churches, Theatres, Art Galleries and Public Buildings in this country.

Among the prominent buildings lighted by Mr. Frink within the past few months are the following:—

ART GALLERIES.

Mrs. R. L. Stuart, 871 6th Ave., New York.
Eden Musee Co., 55 West 23d St., New York.
L. A. Lanthier, 22 E. 16th St., New York.
Fifth Avenue Art Galleries, 366 5th Ave.
Century Club, 109 E. 15th St.
Fifth Ave. Auction Rooms, 246 Fifth Ave.
Bouseal, Valadon & Co., 362 Fifth Ave.
G. W. Lininger, Omaha, Neb.
David C. Lyall, Brooklyn, N. Y.

THEATRES.

Miner's Newark Theatre, Newark, N. J.
Commonwealth Hall, Orange, N. J.
Titusville Opera House, Titusville, Pa.
Academy of Music, Petersburg, Va.
Opera House, Helena, Ark.
Perkins Opera House, Springfield, Mo.
Opera House, Wilkes-Barre, Penn.
Anniston, Ala.
Carbondale, Penn.
Paris, Mo.
Los Angeles, Cal.

CHURCHES.

First Baptist, Minneapolis, Minn.
First Presbyterian, Westfield, N. J.
Holy Trinity, Hoboken, N. J.
Central Congregational, New York.
West Harlem, M. E., New York.
Christ Episcopal, Jordan, N. Y.
First Congregational, Williamstown, Mass.
First Baptist, Franklin, Ind.
Euclid Ave. Congregational, Cleveland, O.
Second Congregational, New London, Conn.
Twenty-Second St. Baptist, Louisville, Ky.
Methodist Episcopal, Chatham, N. Y.
Universalist, Titusville, Pa.
Presbyterian, Greenwich, Conn.
St. Stephen's, Worcester, Mass.
Trumbull Ave. Presbyterian, Detroit, Mich.
Methodist Episcopal, Flemington, N. J.
Jane St. M. E., New York.
First Unitarian, Deerfield, Mass.
St. Rose, Lima, N. Y.
Congregational, De Kalb, Ill.
St. John's M. E., Brooklyn, N. Y.
Methodist Episcopal, San Bernardino, Cal.
First Baptist, Columbus, Miss.
Methodist Episcopal, Ontario, Cal.
Church of the Ascension, Hamilton, Ont.
Madison Ave. Reformed, New York.
Centenary M. E., Newark, N. J.
Greenwood Baptist, Brooklyn, N. Y.
Methodist Episcopal, Springfield, Vt.
Second Reformed, Newark, N. J.
Seventh Day Baptist, Plainfield, N. J.
Zion, Greene, N. Y.
West Side Ave. Presbyterian, Jersey City, N. J.
Presbyterian, White Plains, N. Y.
English Lutheran, Hazleton, Pa.
Brick Church, Presbyterian, Orange, N. J.
Methodist Episcopal, Austin, Minn.
First Baptist, Johnstown, Pa.
Presbyterian Church, Horseheads, N. Y.
Methodist Episcopal, Hackettstown, N. J.
Trinity Church, Portland, Conn.
Dwight Place Church, New Haven, Conn.
First Presbyterian, Galveston, Tex.
Classon Ave. Presbyterian, Brooklyn, N. Y.
Tomkins Ave. Congregational, Brooklyn, N. Y.
Baptist, Beverly, Mass.
Asbury Memorial M. E. Church, Providence, R. I.
St. Bernard's, Raritan, N. J.
Cumberland Presbyterian, Murfreesboro, Tenn.
First Presbyterian, Englewood, N. J.
Pilgrim Congregational, Duluth, Minn.
First Congregational Church, St. Albans, N. Y.
Garland St. M. E. Church, Flint, Mich.
Summer Ave. M. E. Church, Brooklyn, N. Y.
Tabernacle Baptist, Brooklyn, N. Y.
Baptist Church, Bristol, Conn.
Lutheran Church, Wooster, O.
Centenary M. E. Church, Jacksonville, Ill.
Eliot St. Congregational, Newton, Mass.
St. George's Church, Astoria, N. Y.

Correspondence invited. Estimates with special designs furnished when requested.

I. P. FRINK,
551 Pearl Street, - NEW YORK.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 693.

APRIL 6, 1889.

Entered at the Post-Office in Boston as second-class matter.

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A VERY interesting communication is made to the *Engineering and Building Record* by a firm of architects whom the editor of the *Record* asserts to be prominent in the profession, quoting two or three forms for schedules of services which have been under consideration by the firm, and asking for advice and criticism to aid the firm in deciding which schedule to adopt definitely for its future business. As might be expected, the question of a clerk-of-works is particularly prominent in the matter, but the firm seem to be in doubt as to the best way of securing his employment. In the first schedule proposed, the charge for all new work costing more than fifty thousand dollars is fixed at five per cent on the cost, and it is stipulated that a clerk-of-works shall be employed and paid by the owner to supervise the execution of the building, under the direction of the architects. In case the owner is unwilling to employ a clerk-of-works, it is stipulated that the architects shall be considered as relieved from all responsibility for defective workmanship, unless it is clearly shown to be due to faults in their drawings, specifications or written instructions. For buildings costing less than fifty thousand dollars, and more than ten thousand dollars, the charge is eight per cent on the cost, and the architects agree to employ a clerk-of-works at their own expense, who shall visit the building at least once a day while work is in progress, and they agree to be responsible to the full amount of their commission for the conscientious execution of the work. For buildings costing less than ten thousand dollars the charge is ten per cent, and nothing is said about a clerk-of-works. In the second schedule the architects' charge is fixed at ten per cent on the cost for dwelling-houses or apartments costing less than ten thousand dollars, at a round sum of one thousand dollars for those costing between ten and sixteen and two-thirds thousand dollars, and six per cent for those costing more than the latter sum. For buildings other than dwelling-houses or apartments the charge is five per cent where the cost is over ten thousand dollars.

ARCHITECTS who practise in Boston should take notice that a new regulation went into effect there last month, by which the use of the white asbestos-covered "underwriters' wire" for conveying currents for electric-lighting in buildings is practically prohibited, the Fire Underwriters' Union refusing to insure buildings in which it is used for that purpose. As the "underwriters' wire" is much cheaper than the waterproof wire now required, the change will make an important difference in the cost of wiring buildings for electric-lighting, and architects must see that they are not imposed upon by unscrupulous contractors, who, in their anxiety to underbid each other, are very likely to try to get the architect's consent to the use of the inferior wire, which has hitherto been the one most commonly employed, and will lay the blame upon him when the underwriters refuse to accept it, and the whole has to be torn out and done over again.

SOME of our readers may remember a description of a building with a tower five hundred and twenty feet high, or something of the kind, which was, according to the daily papers, about to be erected in Brooklyn, N. Y., for an institution which was to undertake the uniform training of young clergymen of all denominations, upon some system which was not explained, but which included the examination of the stars through a telescope to be mounted in the tower. The name of the institution which had undertaken this rather delicate business was said to be the Biblicon, and large sums of money were reported to have been subscribed to support it. A picture of the Biblicon building was even published in some of the papers, which showed the hand of a tolerably practised designer. From the more recent accounts, derived from the records of the police courts, it seems that the "Biblicon" enterprise was simply a cover for a peculiarly mean swindle, concocted by an architect of a species which, we imagine, contains but one specimen. It seems that the youth in question, after his pretended "Biblicon" building had been sufficiently advertised in the newspapers, invited estimates for it from mechanics of different kinds. One of these, who told his story afterwards in court, said that he was invited to call at a certain office in New York and estimate on the mason-work of the building. He did so, and came to the conclusion that it would cost about one million two hundred and eighteen thousand dollars. He told the architect, who obligingly said that he was afraid he would lose money on it at that price, and advised him to add fifty thousand dollars to his bid, which he did. If the contractor had been better informed in regard to professional ethics, he would have fled from an architect who so far forgot himself as to make such suggestions to him, and would thus have been saved the unpleasant experience which followed; but, like the other people who think that a man who is false to those who trust him will be true to them, he swallowed the bait at once when he was notified that his bid had been accepted, and went to see the architect about signing the contract. The little drama which ensued may be easily divined. After some agreeable conversation the architect mentioned that he was temporarily short of cash, and would be much obliged for a loan of five hundred dollars. The mason had, unfortunately, only two hundred dollars with him, but the architect said that this would do, and took it, giving in return a note, payable in three months. At the end of the three months the note, which had passed into other hands, was protested, and the mason hurried to the architect for an explanation. He was told that the note had matured unexpectedly, but that if he would call again in a few days it should all be settled. As he had already made a contract for forty million bricks for his work, he could not feel quite easy until the little affair with the architect had been adjusted, and called again at the appointed time, only to find that the office was closed, and its occupant had disappeared. Upon this he concluded that it would be prudent to make some inquiries for himself about the building which he was to have so large a part in erecting, and went to Brooklyn, where he found that no plans for such a structure had been presented for approval at the office of the Inspector of Buildings, and, as we understand, that the site of the proposed institution intercepted a public street. Convinced that he had been defrauded, he set out again to find the architect, and, after a long search, discovered him in an office in New York, and had him arrested. Supposing the mason's story to be true, it would be a curious inquiry whether he might not be debarred from obtaining legal redress against the architect, through the questionable nature of the transaction by which he, in collusion with the architect, added fifty thousand dollars to his bid. A man who enters into a conspiracy with another to betray a trust cannot invoke the aid of the courts to make his companion in crime keep his promises; and, although the lending of the money to the architect was not directly connected with the raising of the bid, it was probably understood by both parties as a return for the architect's amiability in suggesting the raising, so that we doubt whether the interests

of morality and public policy very strongly demand its restitution.

THE International Congress of Architects, which we hope some of our readers may be able to attend, will open in the hall of the Trocadéro Palace in Paris, on the seventeenth of June next. The business of the Congress, after the opening addresses, will be divided among committees and sections designated for the purpose, and the ensuing meetings, except the last, will be held in the great lecture-room of the Ecole des Beaux-Arts, called the Hall of the Hémicycle, from the noble fresco of Paul Delaroche which adorns its semicircular wall; some of the sections being also furnished with consultation-rooms in the building of the Sociétés Savantes, in the Rue Serpente. The final meeting will again be held in the Trocadéro, on Saturday, June 22, and the same evening a fraternal banquet will take place at the Hôtel Continental. Any architect may join in the Congress by sending his name previously to the Committee of Organization, or by applying to the Committee on his arrival, and paying a contribution of five dollars, or, if he wishes, of twenty dollars, in consideration of which his name will appear in the printed account of the Proceedings among those of the "Membres Donateurs." Each member properly registered will receive a card of admission, a bronze commemorative medal, and the printed report of the Proceedings. Any French or foreign association of architects may subscribe, either as an ordinary member of the Congress or a Membre Donateur, and will then be entitled to participate, in the person of a delegate, in the privileges of the Congress. Those members who may wish to address any communication to the Congress, upon the subjects mentioned in the programme, which we have already published, or on any other matter of professional interest, must send notice, with a copy, or at least an abstract of their communication, to the Committee on Organization. If the subject to be treated is one of those mentioned in the programme, the abstract must be received by the thirty-first of March. If it is something not included in the programme, it may be presented at any time before the fifteenth of May.

WE imagine that a good many people will be surprised to learn the comparative importance of the exhibits to be shown at the Paris Exhibition, at least as indicated by the energy with which the governments of the countries from which they come have taken part in the matter. To begin with our own country, the exhibits from the United States will occupy an area of about eighty thousand square feet, which will be mostly devoted to private contributors; but the Government has appropriated two hundred and twenty-five thousand dollars, and will make some sort of official exhibit. Our little neighbor, Mexico, has officially appropriated four hundred and fifty thousand dollars, and has a large building of its own, in which will be shown the productions of what most of us imagine to be a nation of priest-ridden Indians. The Argentine Republic, which many Americans, we venture to say, confound with Patagonia, has appropriated six hundred and forty thousand dollars, and will fill a space of sixteen thousand square feet with objects which will not consist exclusively of the hides and horns of wild cattle. Siam is to have twenty-five hundred square feet for its official exhibition, and private Chinese merchants have engaged about three thousand. Japan is to have a splendid agricultural exhibit, besides a larger one of manufactured articles than it had in 1878. Portugal and Austria will each occupy about the same space as Japan, and Monaco, Andorra, and San Marino will be represented. England is naturally to furnish a large part of the foreign manufactures. Two hundred and fifty thousand square feet were originally appropriated to its exhibit, but the space was almost immediately taken up, and for a long time the English Commissioners have had to refuse contributions for want of a place to put them. The price of admission has been fixed by the Committee on Finance at two francs for the "hours of study," from eight to ten in the morning; one franc for the hours between ten in the morning and six in the evening; and two francs for the evening. Season-tickets, good for six months, will be twenty dollars.

THE French Academy of Medicine has recently been entertained by a long and serious protest, written by one of its members, against the employment in dwelling-houses of the so-called "movable stoves," which have a certain connection with the chimney, by means of a flexible smoke-pipe, but are liable to leak carbonic-oxide gas. Every one knows the poisonous effects of carbonic oxide, but the introduction of the movable stove has brought them more prominently into notice, by the number of deaths which have already occurred through the use of them. It seems that poisoning by means of these or any other sort of leaky stove may be either rapid or chronic. In cases where the amount of gas inhaled is small, but the dose is often repeated, the patient suffers from loss of appetite, occasional vertigo, and violent headaches, and seems to fail in strength, from no very obvious cause. Where the amount of gas inhaled is considerable the sufferer becomes dizzy, then unconscious; the brain is directly affected, and with it the main nervous centres, and death speedily results. If the dose has not been large enough to produce death, the patient lingers through a long and painful convalescence, the effect of the poison on the blood disappearing only by slow degrees. Among us, the movable stove has as yet hardly made its appearance, but we have an apparatus of very similar character, in the shape of the gas stove, whose merits and demerits greatly need investigation at the hands of experts. It may be that the gas-stove, as ordinarily employed, with its outlet pipe pouring all the products of combustion into the room in which it is placed, is an innocent affair, but we should like to have it proved, and if it is not proved, we should like to have the public warned against its use.

SOME remarkable stories are told of a new steam-turbine, which has come into rather extensive use for driving dynamo-electric machines in England. The inventor is Mr. Parsons, who, we suppose, must be the same with the inventor of the engine with four cylinders, revolving with the shaft, which we described some years ago. If it be the same, his subsequent researches seem to have taken the direction of the application of steam directly to fixed wings on the shaft, instead of using the indirect system of cylinders and pistons. As the water-turbine is the most efficient means of utilizing a natural force yet known, it is not strange that many efforts have been made to apply the same principle to steam-motors, but they have hitherto met with little success. Mr. Parsons, however, has avoided the defects of other machines, and has introduced some important improvements. The best of these is perhaps the adaptation of the compound system, each of the more powerful turbine machines securing triple expansion, by using three turbines, in series, the steam expanding from each into the next, while the surfaces are so arranged as to give nearly equal power to each. Moreover, instead of expanding from a certain fixed pressure to another fixed pressure, the wings of the turbines are themselves arranged expansively, so that the pressure of the steam diminishes gradually from its entrance into the machine to the exhaust. Through this graduation of the pressure, supplemented by an ingenious system of journals, the movement of the engine is made extremely smooth and uniform, even at enormous speeds. In the recent exhibition at Manchester a motor of this kind, connected with a dynamo, was suspended by two wires from the ceiling. There was no swinging or vibration of any kind, and the machine appeared to be quiescent, yet it supplied current for all the incandescent lamps in the machinery hall. The rapidity with which the new engine can be run is almost incredible. The earlier Parsons engine made twelve thousand revolutions a minute, which was considered a very high speed; but the first steam-turbine which succeeded it has been furnishing six horse-power, at the rate of eighteen thousand revolutions per minute, almost continually for four years, and is still in excellent condition. How a machine is held together at such speeds it is difficult to imagine. A few days ago a dynamo in the basement of a store in Chicago, running at the rate of only thirteen hundred revolutions a minute, burst by its own centrifugal force, the engineer being seriously hurt by the flying fragments; and a similar apparatus, revolving three hundred times in a second, would appear to be a dangerous neighbor. This view of the matter, however, does not seem to trouble the expert editor of the *Revue Industrielle*, who is so much pleased with the new device that he intentionally gives the account of it the place of honor at the head of the first number of the volume for 1889, which, as he says, will probably contain descriptions of an unusual number of interesting mechanical devices.

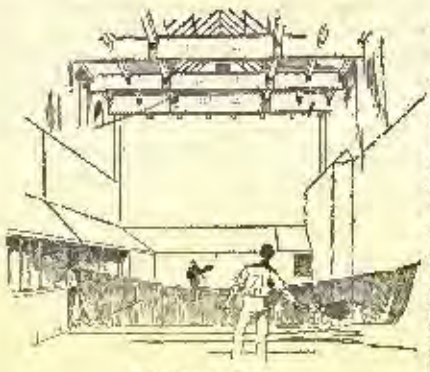
THE people who talk about the "intellectual purity of appearance" of the marble temples of Greece would do well to read the discussion now going on in *L'Architecture* on the antique polychromy, between M. E. Loviot and M. Pottier. Both these gentlemen are experts in archæology and architecture, both have directed archæological explorations in Greece, and the main point of difference between them appears to be, not whether the Greeks applied paint to portions of their temples, but whether they ever left any part of them unpainted; M. Pottier doubting whether they painted the outside steps, while M. Loviot, who himself found the floor of the temple of Jupiter Panhellenius at Egina, when excavated in 1878, covered with stucco and painted red, believes that if they disliked the appearance of a bare marble floor they would not stop at the steps, but would cover them, as appearances still remaining indicate that they did, with color similar to that of the pavement. In fact, his long experience leads him to the conclusion that in the Greek temples, whether of marble or coarser stone, no white was ever left visible, in any part of the building, either inside or outside, except where touches of white pigment were used to accentuate small ornament, or in decorative patterns.

THE woes of architects continue to occupy a considerable space in the foreign technical papers, as well as in our own. M. Bérard, one of the fraternity, writes to *La Semaine des Constructeurs*, as only a clever Frenchman can write, giving a list of the virtues, accomplishments and duties expected of a French architect, and comparing it with the remuneration that he receives in return for them, which will excite the sympathy of the profession everywhere. The principal works, it seems, that a Parisian architect is expected to perform with cheerful alacrity and with perfect skill and success, are, in the order in which they generally present themselves to him, about as follows: Measurements and plans of large lots, for the purpose of sketching subdivisions and the laying-out of streets; measurements and plans of small lots, for the purpose of laying-out schemes for building; measurements and plans of quarries or other subterraneous circumstances; measurements and plans of existing buildings; examination of deeds and titles; preparation of sketches, studies, working plans, elevations, sections, details, specifications, estimates, contracts and sub-contracts; negotiations with inspectors of buildings, police officials, superintendents of sewers, city engineers, street commissioners and other public officers, to obtain the necessary permits to carry out the work; calculations of the strength of beams, walls and piers, columns, trusses and ties; supervision of the work during its execution, with the regulation of extras, examination of accounts and certification for payments; arbitration in case of dispute; assistance in case of suits before courts or referees; management of funds held in trust for the purpose of carrying out the building; purchase of land, buildings or materials; preparation of schemes for the financial management of building enterprises, this work involving a knowledge of the money market, acquaintance with banking methods, and a knowledge of the fluctuating values of real-estate and building materials and labor; negotiations in regard to party-walls; and assistance in fixing rents, arranging for repairs and estimating losses in case of fire. It will be observed that this catalogue, which says nothing about prescribing medicine for his client's horse, or offering suggestions in regard to agriculture, would be very imperfect for an American architect, but even so limited a list seems to M. Bérard to imply on the architect's part an amount of intelligence, knowledge and activity far surpassing the ordinary capacity of the human intellect. To carry out such duties in the manner which laymen generally expect, and New York judges require, the architect must be not merely a man of science, of profound reading and immense experience, but he must be also a lawyer, a business man, a financier, a real-estate agent, a conveyancer and a civil engineer, to say nothing of the moral virtues of honesty, energy and courage, which he must possess for performing his duties, not only of certifying builders' accounts, but of climbing over roofs, and descending into the drains, wells and other objectionable places which he is called upon to visit.

IN return for the display of all these virtues and accomplishments, one would expect to see the architect receive a princely remuneration, which would be guaranteed to him by the unanimous consent of mankind. In France, however, as M. Bérard says, we find, instead of this, the architect placed practically at the mercy of any one who has the heart to try to plunder him. After his work is done, if his client chooses not to pay him, he has nothing for it but to wait, two, three, five or ten years, until his debtor experiences a change of heart, or some "compromise" is made, by which he submits to be robbed of a part of the money that is due him, for the sake of getting the rest. If this course does not suit him, he has the option of appealing to the courts, where, after distributing fees and dancing attendance upon lawyers, witnesses and judges for two or three years, he has at last the advantage of being exposed for a season to the assaults of what M. Bérard calls his worst enemy, the professional expert, from whose artfully directed blows he may, if he is fortunate, escape without adding a second loss to that which he has already sustained, but can hardly hope for anything more. Outside of these two alternatives, he has no resource whatever, or rather, as the editor of *La Semaine* interpolates, had none until the Architects' Protective Association was formed; for he alone, of all business men, is denied the right to cite customs and tariffs in opposition to the whims of judges and jury.

THE New York *Tribune* has found an architect in this country, more discontented, if possible, than M. Bérard. According to this gentleman, it is useless for any one who has not a large capital, or at least "extensive social affiliations," to attempt to be an architect. If a person not endowed with these requisites enters the profession, he is very likely to spend the rest of his life as a draughtsman in offices, on a small salary, which he has to compete for with cheap foreign draughtsmen; or if he should be so fortunate as to get a little business for himself, he is almost sure to be cheated in some way out of the pay for it. The "trickery and deceit" which, judging from his experience, architects have to encounter, would surprise ordinary people. For example, he had himself been asked, a few days before, by a "down-town merchant," to furnish sketches for a house, the sketches to be paid for only if accepted. He made the sketches, which were rejected, but not until the merchant had had time to steal tracings of them, and he had since learned that ground had been broken for the house, which was to be carried out substantially in accordance with his design. So far as he could see, he had no redress for this barefaced fraud. In another case that he knew of, a wealthy real-estate owner, proposing to erect an office-building in the city, sent out circulars to architects, inviting them to submit full plans and specifications for it, and promising to pay a handsome sum for the ones accepted. The plans were sent in, and after examination, were all returned to their authors as "unsuitable." Meanwhile, however, they had all been traced by a clever, but dissipated draughtsman, whom the proprietor had picked up somewhere, and the same artist afterwards combined the designs into a conglomerate structure, which stands at this day in the lower part of New York, as an example of mercantile acuteness, and, we might add, of the folly of architects. It does not require a very discerning mind to perceive that if the architects in question had simply shown ordinary prudence, in declining to do any work "on approval," or, if they wished to enter into competition, in waiting until they were offered proper terms, they would not now be suffering from the feeling of having thrown their time and money away for nothing, or from that sharper sting, the consciousness of having made themselves ridiculous in the eyes of their deceiver and his friends, by their childish credulity and lack of common-sense. A person who allows himself to be deluded by such proposals may, perhaps, deserve the pity of the humane, but he merits no sympathy or consideration from architects, whose good name he degrades by his folly, while he seriously injures their business by his idiotic competition for work which either he or they might do at a fair price, if he were not always ready to be deluded, on the most transparent pretenses, into doing it for nothing. In the cases, which are quite common enough, where architects are really misled by false promises, or cheated out of their earnings, some means of securing justice quickly and cheaply is greatly needed, and we hope that the reorganized American Institute, of which, by the way, we hear nothing, will address itself in earnest to the question; but people who wish the profession to help them out of their troubles should deserve that favor, not only by loyalty to professional principles, but by showing, in their transactions, a decent amount of prudence and self-respect.

THE BOSTON ATHLETIC ASSOCIATION'S BUILDING.



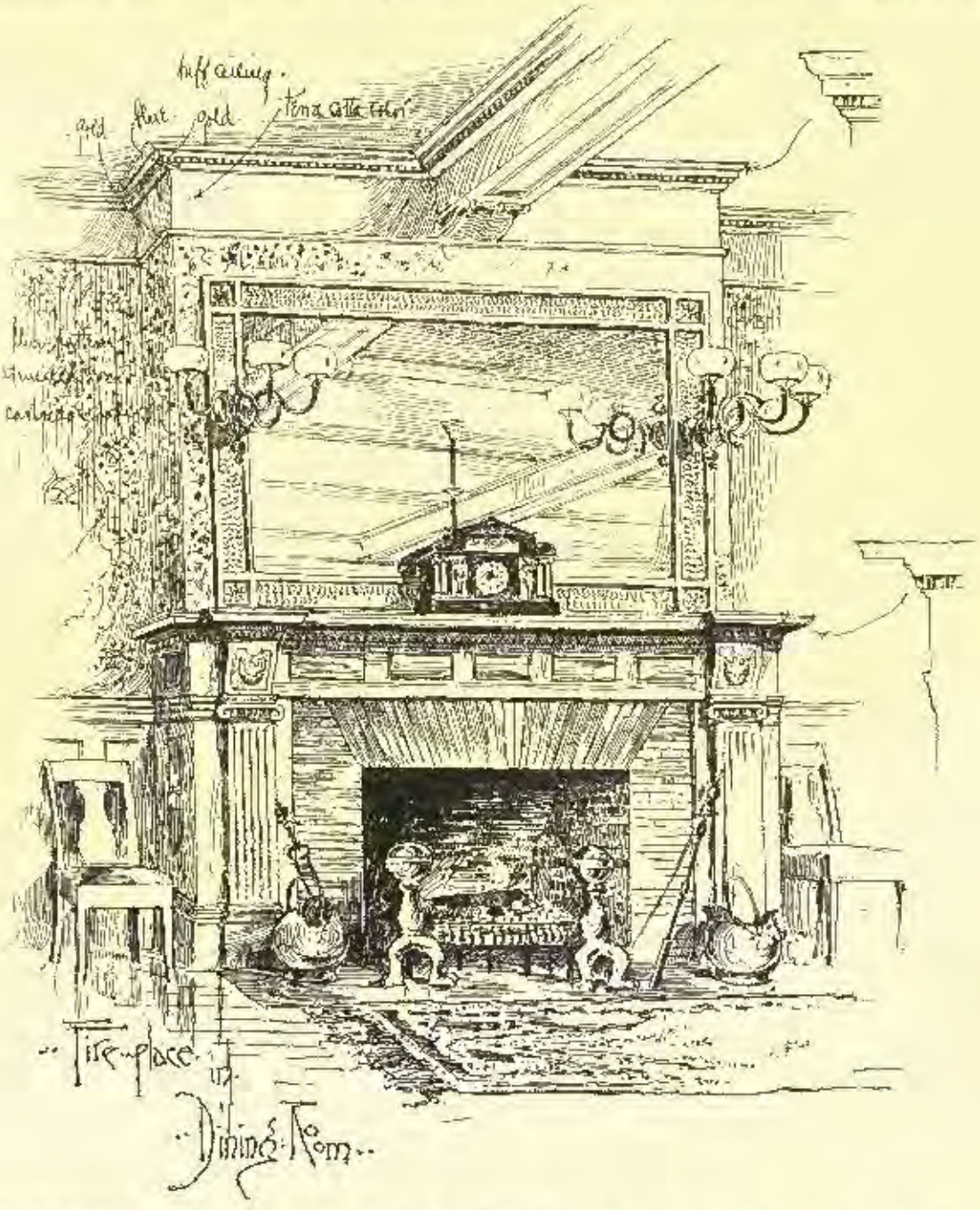
The Tennis-Court.

No new building in Boston has attracted so much attention as that recently opened by the Boston Athletic Association, on Exeter Street, and certainly no one reflects more credit on its architects and the building-committee, who, in place of being troublesome and practically useless coadjutors, could in this case hardly have been dispensed with, for the requirements which the architects were called upon to satisfy were of a kind that any ordinary architectural training threw no light on, and there were few precedents that could be consulted.

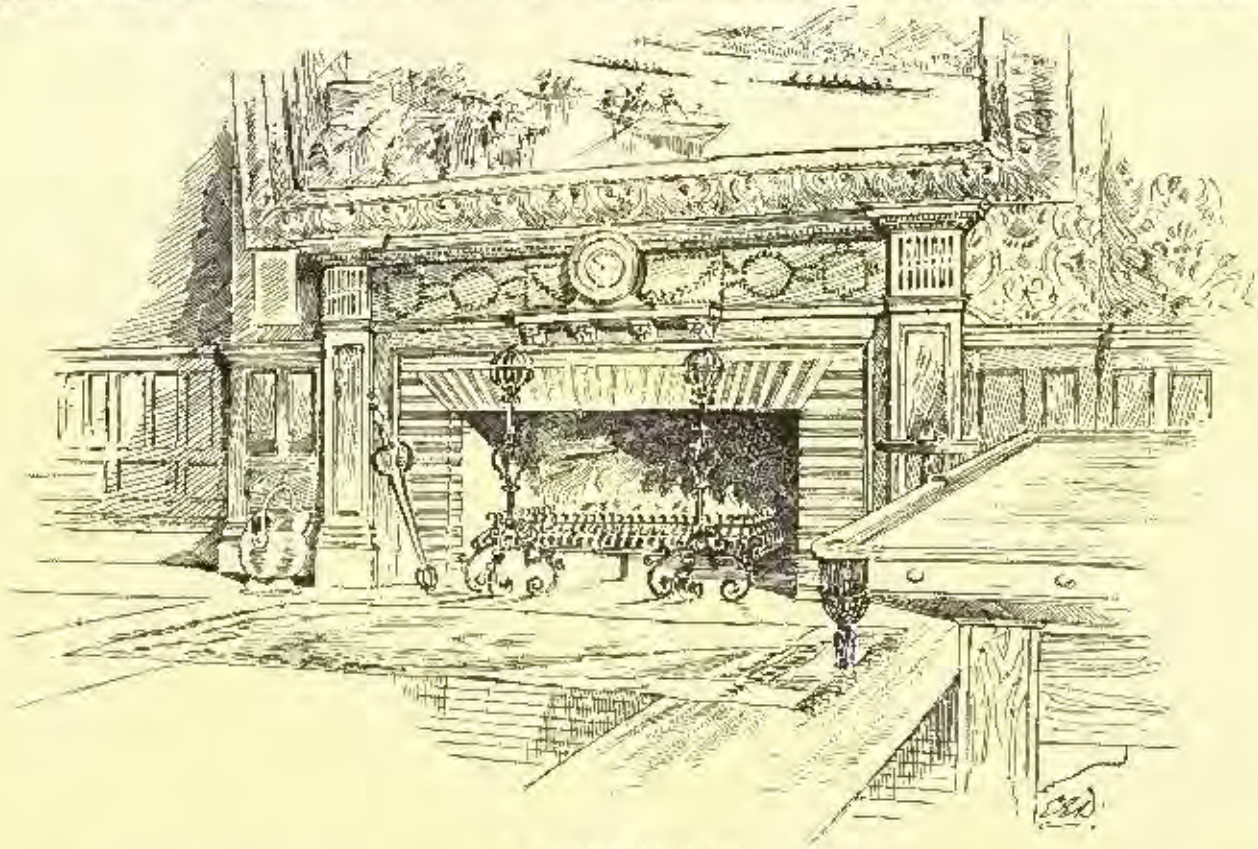
The movement began with a few men who had always taken an interest in outdoor sports, who found that when the open season closed there were practically no means at hand for keeping up that bodily condition which, when once enjoyed, one is willing to do so much to preserve. To be sure, there was a tennis-court here, a gymnasium there, a bath yonder, billiard-rooms in all the club-houses and restaurants everywhere, but all were more or less widely scattered, all subject to separate membership fees and rules, and all more or less unsatisfactory for one reason or another.

A few preliminary meetings made it clear that the movement could have support; the association was incorporated, bonds issued and taken up by interested members who had capital they were willing to invest in this way. This first step taken and a site secured; the next was to procure the necessary plans, and few will deny that a very satisfactory result has been achieved. The fact that some of the rooms are a size too small is a misfortune attendant on the inability to procure a larger lot. Excellent advantage has been taken of the space available, and in compactness, distribution and convenience it is an interesting model to be consulted by those who may have similar buildings to erect in other cities.

From the very start success has been a certainty, and it has been owing to the central idea of uniting under one roof the elements of a social club and an athletic association, since it secured the support and countenance of elder men — the more opulent relations of the younger athletes — who would hardly have thought it worth while to subscribe to the support of a mere gymnasium which they were likely to use but rarely, partly through indolence, and partly through an unwillingness to show their younger fellows how years and disuse had softened their tissues and taken from the former manly grace of figure they once so highly esteemed. But thanks to the commingling of the provisions for social and athletic enjoyment these athletes of a former day do not find themselves out-of-place here, and under the pretense of a lounge can get actual profit from their membership by taking such casual exercise as their years and inclination may permit, without feeling obliged to take up the systematic and regular course of



exercise that membership at an ordinary gymnasium would naturally urge on the really unwilling man of years. A half-hour at the weights in a place like this, with a pleasant dining-room below and ample lounging-rooms and good company around, is a vastly more agreeable thing to contemplate than the same time spent in a bare and ill-smelling gymnasium, when it has to be followed by a chilly walk home, or a still more dangerous ride on the horse-cars. The force of servants and superintendents, and it has wisely been decided to make it practically self-supporting by charging fees for the use of bowling-alley, tennis-court, billiard-tables, Turkish-baths and so on, while the gymnasium proper is free to all. It is here that one whose memories of gymnastic apparatus go back twenty or thirty years to the little, old gymnasium at Harvard opens his eyes and goes about with a mien of respectful inquiry, trying to discover the



Fireplace in the Billiard-room.

real element of success lies just here, and whoever originated the idea of such combination, should be considered the founder of the club.

Although opened only a few weeks ago, it is already the most popular resort in the city — so popular, in fact, that the older clubs which are merely social in character, already feel that the current of favor is setting away from them, and foresee a possibility that their past prosperous financial condition may, in time, be impaired through the greater attractions offered by the new club which already has a waiting-list of several hundred; although, since the opening, the membership has been increased beyond the limit originally fixed.

The plans and illustrations published herewith practically give all the information that can be given, but they can give but an imperfect idea of the homely and homelike air that pervades the building, so different from that which oppresses one in so many club-houses where

A Corner of the Billiard-room.

the first — or a main — intent is a showiness, or, at least, elaboration of architectural and decorative features, which makes one feel as if he ought to appear there only in full evening dress.

The membership of the club is so large that it will evidently be easy to provide for the interest on the bonds and the needful sinking-fund. But so large and complex an establishment requires a large

whys and wherefores of the intricate apparatus whose very neatness and perfection of workmanship is, at once, an invitation to strip and go to work, and an irritation, as one feels aggravated that these things were not invented two or three decades ago. Clubs and bars and rings can be recognized, but this great array of lifting-weights of different models need explanation, accompanied with demonstration, before it is possible to understand their uses or conceive what set of muscles they are to develop. Many of these are due to the ingenuity of Dr. Sargent, the Superintendent of the Hemenway Gymnasium, at Cambridge, and give evidence of the wisdom of employing in that position a man of intelligence and education, rather than the retired "bruiser," as in the olden time.

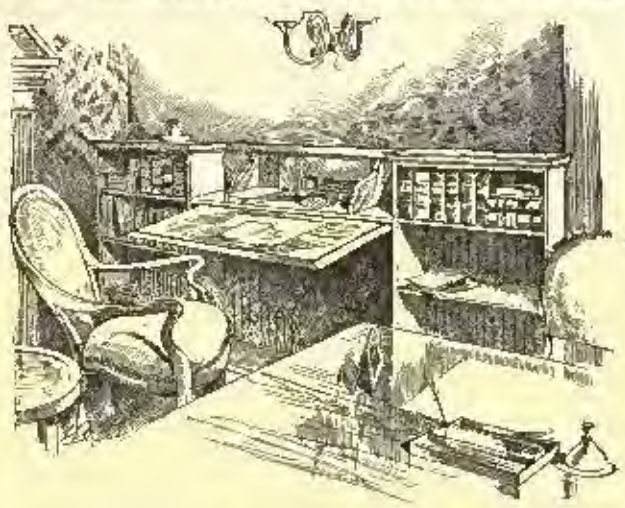
In regard to the plan and arrangement of the building, we are obliged to begin contrary to custom, at the top. The tennis and racquet courts being of fixed dimensions regulated the main partition-

Buffet in the Dining-room.

walls and even the length of the building which just accomodates the tennis court. The building is then divided into three main divisions, one the width of the tennis-court, one the width of the racquet-court, and the third the space left between when these two are taken out. The gymnasium, occupies all the space under the tennis-court and this central section, and we find that there is now only one portion of the building which being unoccupied from top to bottom is suitable for a staircase, viz., the space left at the end of the racquet-court, and

here the main one must be. Room is found for the second by taking out a corner of the gymnasium proper and this is of iron, in a brick well. So much for the skeleton arrangement; the various floor plans show the result.

We enter on a level from the street on what is practically a mezzanine floor. One flight down carries us to the Turkish baths,



Wall Desk in the Writing-room.

with the tank and lounging-room for the bathers and spectators and a flight up takes us to the main social floor; while on the level are the private bowling alleys, which being for ladies' use as well as members', are directly at the entrance, the storage-room for cycles, and the barber's shop.

In all the decoration of the building economy and durability have been the first considerations. In view of the experimental character of the undertaking, the first was a necessity and the latter almost equally so for a club which the founders intended to be permanent.

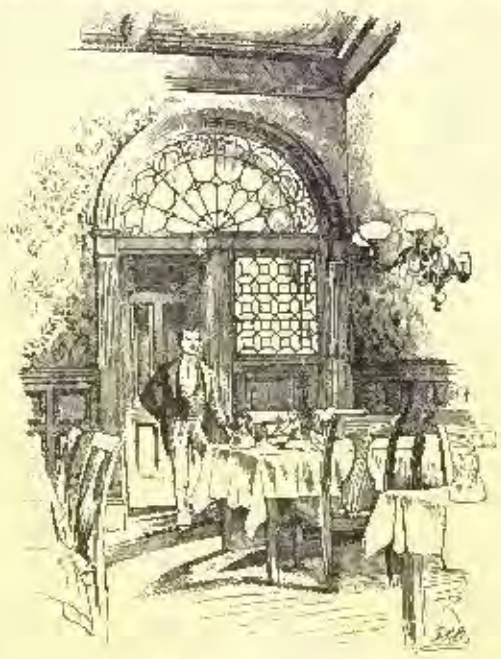
Exit from Reception-room to Stairway.

In the basement then we find extreme simplicity, the walls of the lounging-room and tank of Massachusetts brick are all exposed and the only decoration permitted is a stencilling of strong green over the upper part of the lounging-room walls, which especially at night is very effective. Five great arches divide this room from the tank, 25′ x 38′ and holding some 60,000 gallons. Below the water-line this is built of glazed brick, the upper six courses light green and the bottom the same, while the remainder is white. A graded platform at one end gives any required height for a dive, and a spring-board at the other end gives opportunity for running-dives and somersaults. At the same end a platform under water makes a shoal space 8 feet x 25 for the use of the inexperienced and the children of members, who can here have lessons at stated hours. The water is filtered through a large Oliphant filter which makes the otherwise yellow water of Cochituate clear and colorless, and by the aid of steam-pipes laid about the bottom of the tank is to be kept at a temperature of about 65° to 70° Fahrenheit.

Fireplace in the Morning-room.

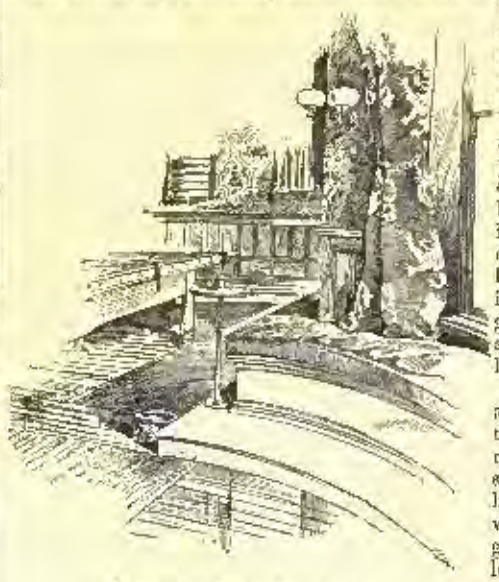
The Turkish-baths proper, following a not unusual plan in the East, are clustered around one central room which is covered by a dome. The four openings are Moorish arches in green, brown and white glazed brick and the walls up to the springs of these arches are of the same material. Above, and up to the spring of the dome a Persian pattern in blue and green is stencilled on the rough plaster, and the dome is relieved by medallions of color, and circular windows filled with stained-glass.

The rooms surrounding are low studded (the half-story only) and are, a room at 140°–150° Fahrenheit, a room at 160°–170° Fahrenheit, a steam-room or Russian-bath, with shower, and a room for massage and the shampoo. Having finished in this last room, the bold bather takes a cold shower and then plunges into the big tank, while the one who fears the shock returns as he came. Before dressing he can receive a rub down with alcohol, which will prevent his catching cold and will act like a cocktail before dinner.



A Bit of the Dining-room.

On the social floor we find the usual club-rooms, with the exception of card-rooms and private dining-rooms—there being absolutely no space for these. What rooms there are, are large: the dining-room seats 80, the billiard-room gives very ample room for 6 tables and could accomodate 8, and the drawing-room, morning-room and library will easily accomodate those who are resting from their exercise or are too lazy to participate in the sports which the building affords. The three last-named rooms are papered in quiet colors, light red being the prevailing tone in the drawing-room, yellow in the morning-room, and dark green with oak and gold in the library.



Bay-window Seat in Billiard-room.

The furniture is all in keeping with the size of the rooms, and is massive oak or mahogany, covered with soft, red, green, or russet leathers.

The billiard-room, which is in oak, has seats all around and the walls covered with buckram, which, on the natural ground, is stencilled with a good mediæval pattern in golden browns, harmonizing with the oak and the buff tones of the beamed-ceiling. This latter is of stucco, and covers the great girders, some of which weigh over seven tons, and which span nearly 40 feet, carrying the gymnasium floor.

The dining-room is in cherry, natural color, as it is the dark room of the building, and the walls are stencilled in green, on a light yellow cartridge paper. Two dumb-waiters run 70′ up to the kitchen floor, and the *table d'hote* meals are served from a hot-table in the china-closet.

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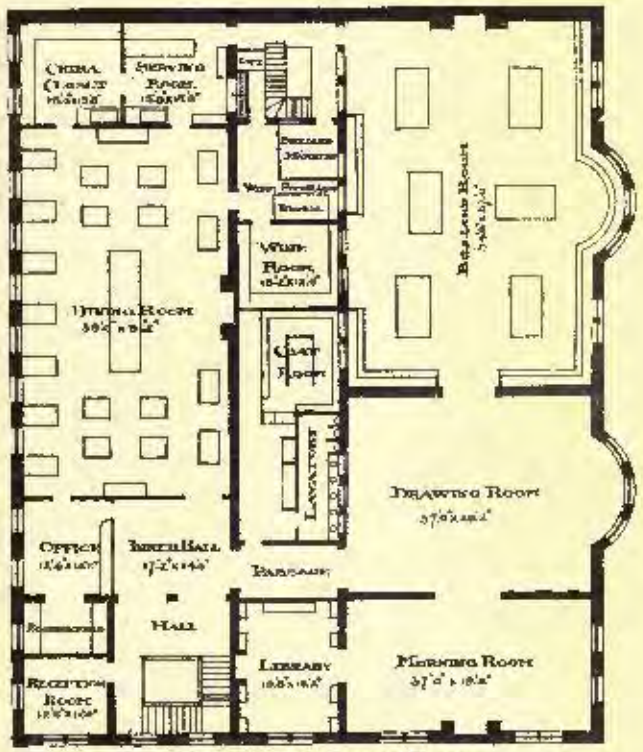
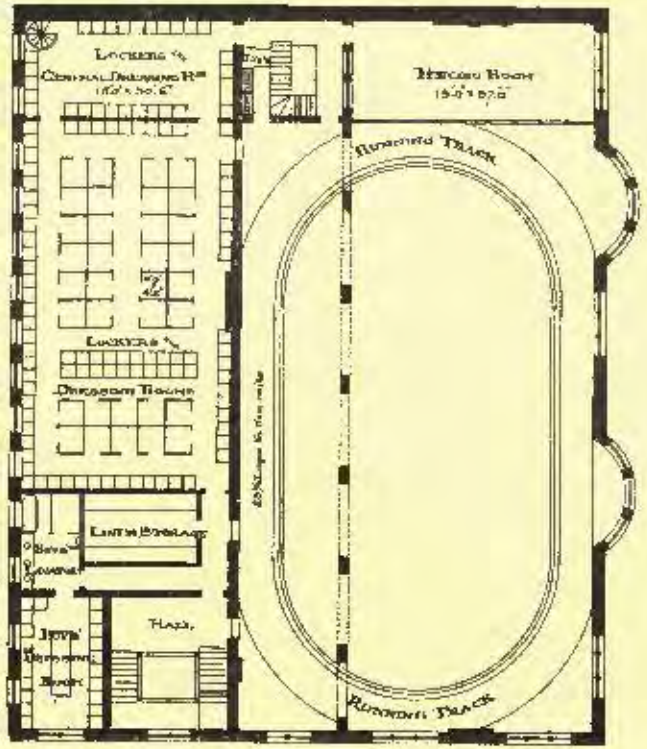
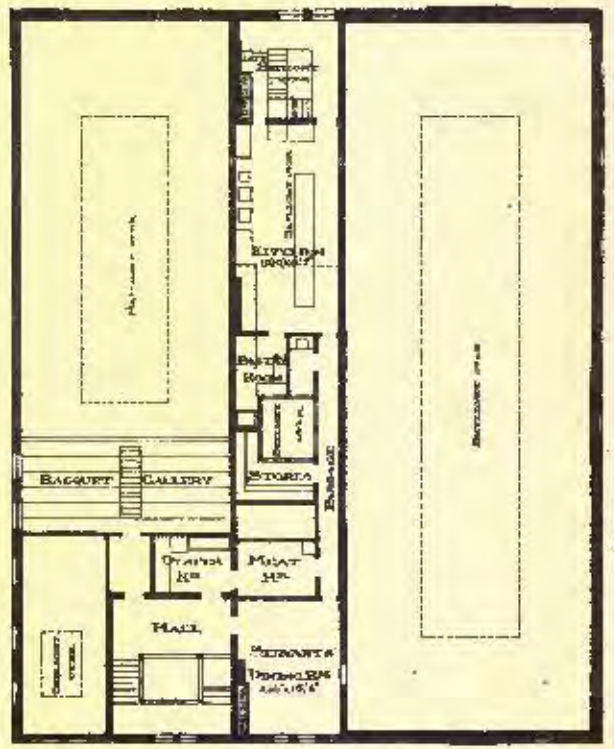


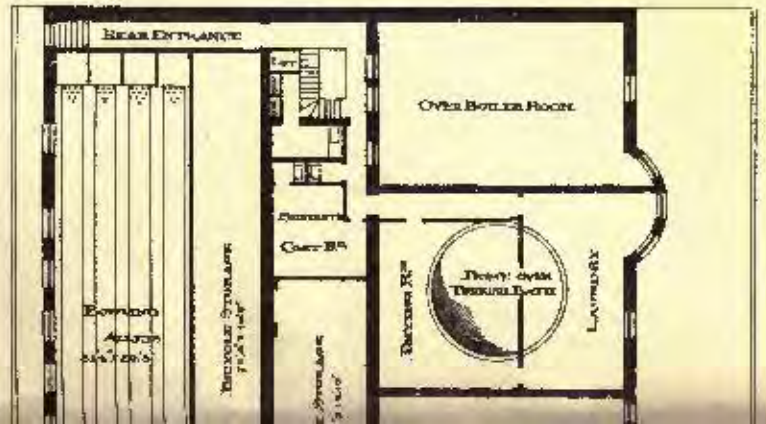
Plan of First or Social Floor.



Plan of Second Floor Mezzanine.



Plan of Second Mezzanine and Third Floor



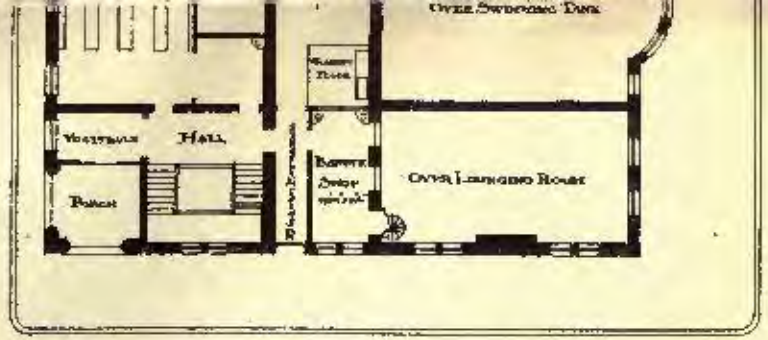
Floor Plans

of the

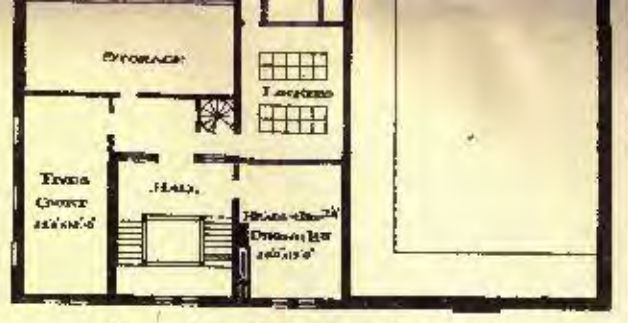
Boston Athletic Association

SCALE 0 5 10 15 20 25

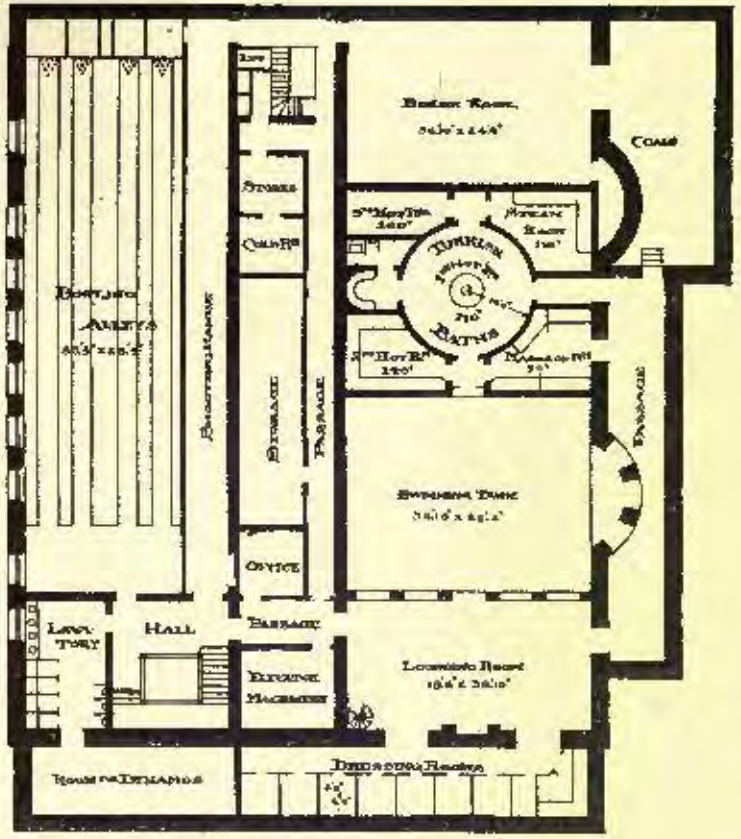
John H. Sturgis,
and
Sturgis & Cabot, Successors
Architects
1887-89



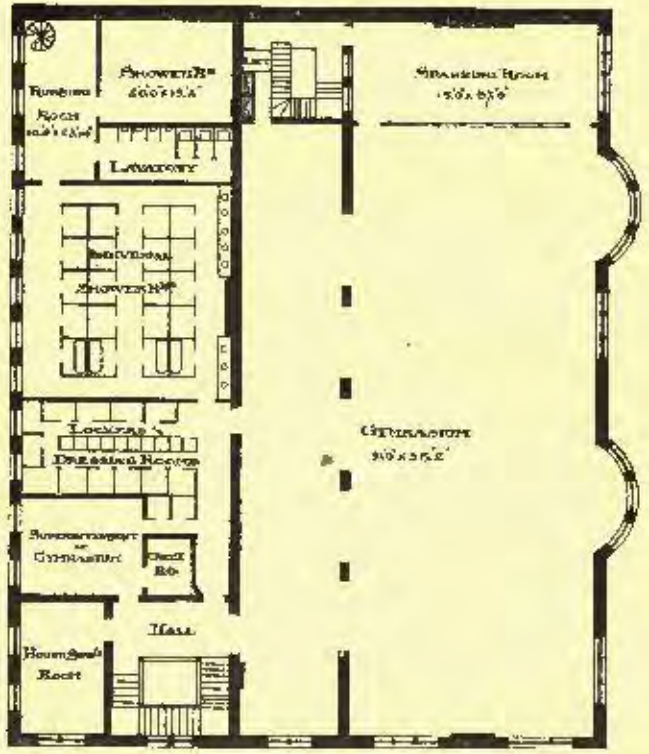
Plan of Basement Mezzanine



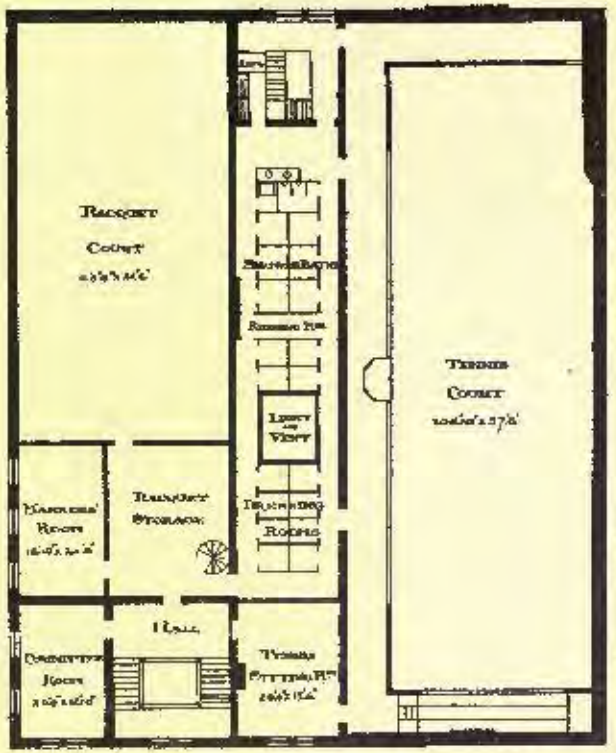
Plan of First Mezzanine and Third Floor



Plan of Basement.

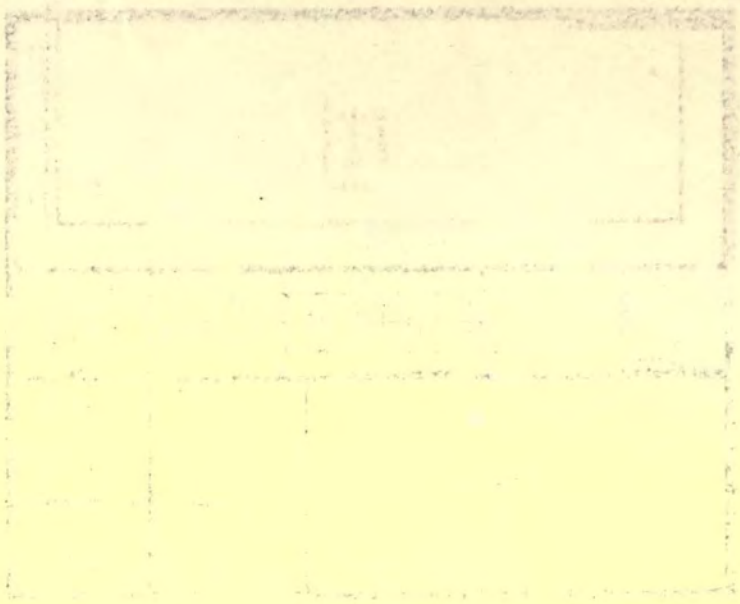


Plan of Gymnasium or Second Floor.



Plan of Third or Tennis Court Floor.

Heliotype Printing Co. Boston.



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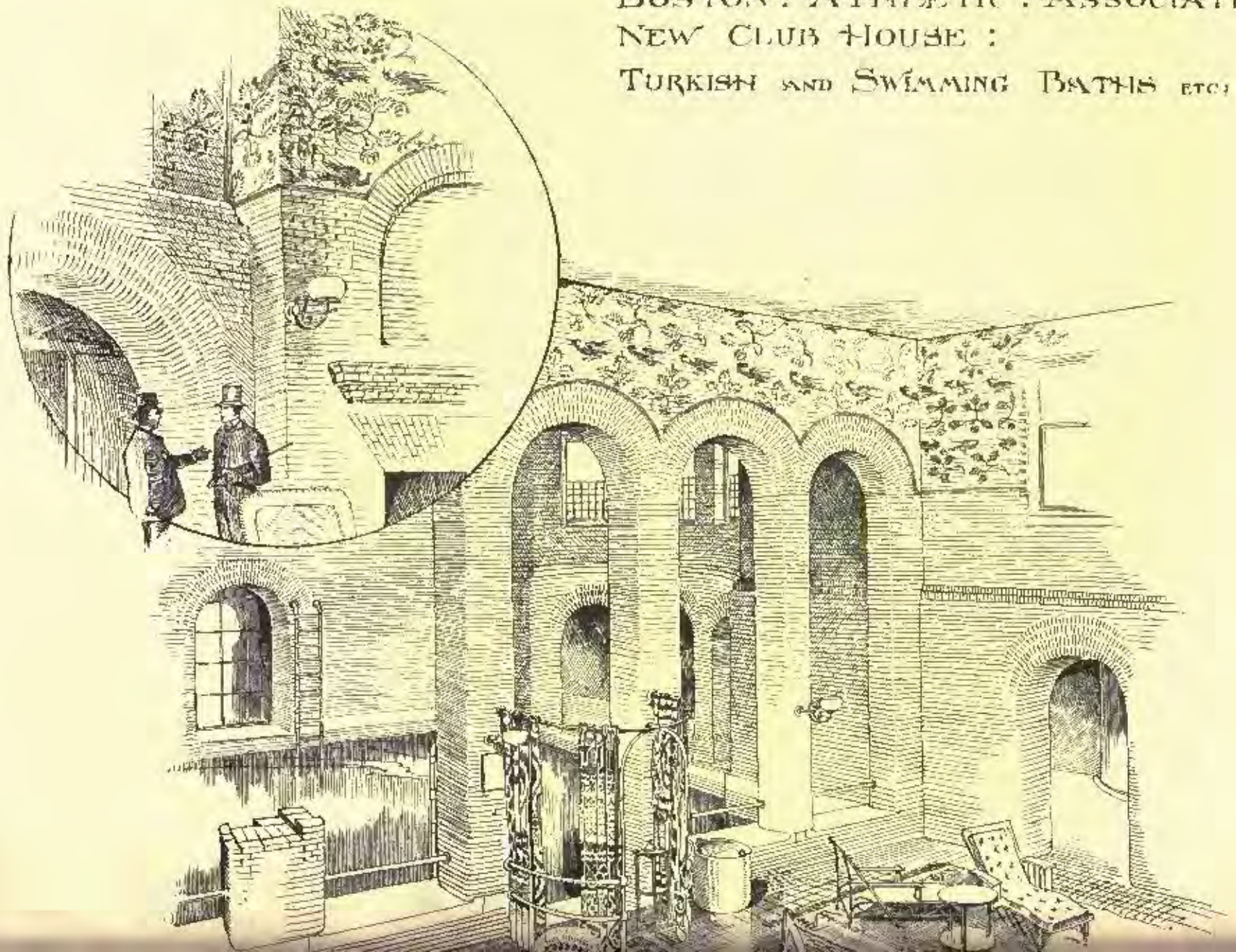
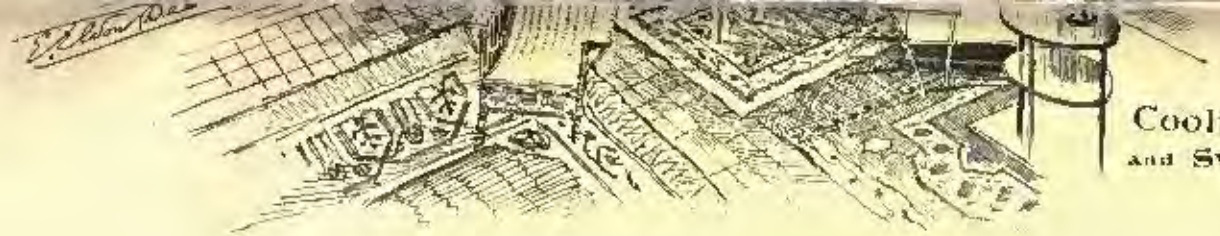
BOSTON ATHLETIC ASSOCIATION'S BUILDING,—THE BILLIARD-ROOM.

J. H. STURGIS [STURGIS & CABOT, Successors,] Architect.

BOSTON ATHLETIC ASSOCIATION.
NEW CLUB HOUSE:
TURKISH AND SWIMMING BATHS ETC.





Cooling Room.
and Swimming Bath

Exit from the Hot Rooms

1st Hot Room

Heliotype Printing Co. Boston.

American Architect and Building News, Apr 6 1889 No. 693.

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Phototype Printing Co. Boston.

On the second floor, and the mezzanine on a level with the running-track, are the gymnasium and all its baths and dressing-rooms. A special effort has been made to make both these latter as convenient and complete as possible. The members, instead of owning large lockers where they hang their own clothes to be aired or dried as they may, have merely small cupboards, only large enough to receive their clothes when folded. An attendant receives the exercising clothes when taken off, and carries them to a large well-ventilated drying-room, kept at a temperature of 90°. When dry and aired, he folds them and places them in the lockers ready for use. The dressing-rooms accommodate two each, and there the clothes are hung up while exercising; all valuables having been left at the gymnasium office. Besides bath-tubs and bowls, there are a number of private shower bath-rooms where the bather may take a shower or a douche of any required temperature, or he may go to the general shower bath-rooms and there receive the benefit of more complicated showers.

On the third floor are the two large courts, which, as they are the same as all other racquet and tennis courts, needs no especial description. The walls of one are of Keene cement, colored red, and of the other, Portland cement painted black, and the floors are an inch of Portland cement, on 4 inches of concrete, on hard-pine planking, which is exposed below as the gymnasium ceiling. They are lighted by skylights half the width of the court, and running nearly the whole length.

The outside speaks for itself. It is of simplest materials, Massachusetts brick, with a sparing use of Anderson pressed-brick, as economy was the one ruling force with the architects. The large spaces to be spanned and the heavy floors of the courts made it necessary to use heavy box-girders which added considerably to the difficulties of the construction, as they tended to centralize weight at certain points.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE BOSTON ATHLETIC ASSOCIATION BUILDING — THE GYMNASIUM, BOSTON, MASS. MR. J. H. STURGIS [STURGIS & CABOT, SUCCESSORS], ARCHITECT, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

THE BILLIARD-ROOM IN THE SAME BUILDING.

[Gelatine Print, issued only with the Imperial Edition.]

BUILDING OF THE BOSTON ATHLETIC ASSOCIATION, BOSTON, MASS. MR. J. H. STURGIS [STURGIS & CABOT, SUCCESSORS], ARCHITECT, BOSTON, MASS.

For description see elsewhere in this issue.

TURKISH BATH AND SWIMMING-TANK OF THE BOSTON ATHLETIC ASSOCIATION.

PLANS OF THE BUILDING OF THE BOSTON ATHLETIC ASSOCIATION.

SKETCH FOR COUNTRY CHURCH, CHAPEL AND PARSONAGE, MONTCLAIR, N. J. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

INTERNATIONAL CONGRESS OF APPLIED MECHANICS.—There will be held at Paris at the Conservatoire des Arts et Métiers, an International Congress of Applied Mechanics, under the patronage of a Committee of Honor, comprising *savants* and engineers of renown both from France and from other countries, who will give the work of the Congress the benefit of their influence and the weight of their authority. The President of the Committee on Organization is Monsieur Phillips, ex-Inspector-General of Mines (retired). The five members appointed from the United States are, in the order of their mention on the official bulletin: Messrs. Robert Grimshaw, (President Polytechnic Section American Institute, New York); R. H. Thurston, (Director, Sibley College of Cornell University, Ithaca); Professor Egleston, (Columbia College School of Mines, New York); and the Presidents of the American Societies of Civil and of Mechanical Engineers. At this Congress, among the important subjects submitted for discussion are: the unification of the horse-power; the choice of materials in machine construction; the mechanical production and utilization of artificial cold; transmission to a distance, and distribution, of work, by other means than electricity, (water, air, steam, cables, etc.); automatic cut-off engines with several successive cylinders; thermo-motors other than the steam-engine. Other topics, treated by papers, will be: improvements in steam-engines since 1878; progress among associations of owners of steam appliances; and improvements in apparatus for the generation of steam, (more particularly sectional boilers).

AMONG THE CAPITALS OF ITALY.[1]

Fig. 1. From the Baths of Caracalla.

THERE is not in the whole range of architecture a more delightful section of study than the one having to do with the evolution of the capital. To trace the growth of that chief of ornaments from the time when our savage forefathers bound a cluster of leaves around the summit of the forest column, to the days when cultured Phidias embellished the Parthenon with his inimitable work, is interesting enough; but to follow its course through the fascinating era of the Italian Renaissance reveals a history which is hardly short of romantic. On the glorification of the capital the ornamentist has bestowed the very flower of his thought, the sculptor the most cunning efforts of his chisel, and even the poet has delighted to hang a few garlands on its volutes. In the days of the old Greeks, its lines, when once evolved by a "master," were looked upon with such veneration that they became as the laws of the Medes and Persians. A definite form of capital was associated with a particular epoch, and to amend or alter it, when used in that association, was considered little short of sacrilege. Even now, after centuries of research, it must be confessed that it is difficult, if indeed possible, to improve upon the capitals devised by the old Grecian architects; for over two thousand years of usage have not succeeded in rendering them at all stale and unprofitable. Phidias and his immediate successors were the artificers who, above all others, succeeded in handing down to posterity what Lord Macaulay calls

> "The stone that breathes and struggles,
> The brass that seems to speak;
> Such cunning they who dwell on high
> Have given to the Greek."

Having hung my chaplet of praise on the capitals of Old Athens, I shall proceed to do what may appear to be inconsistent with that votarial offering; for, paradoxical as it may seem, the main object of

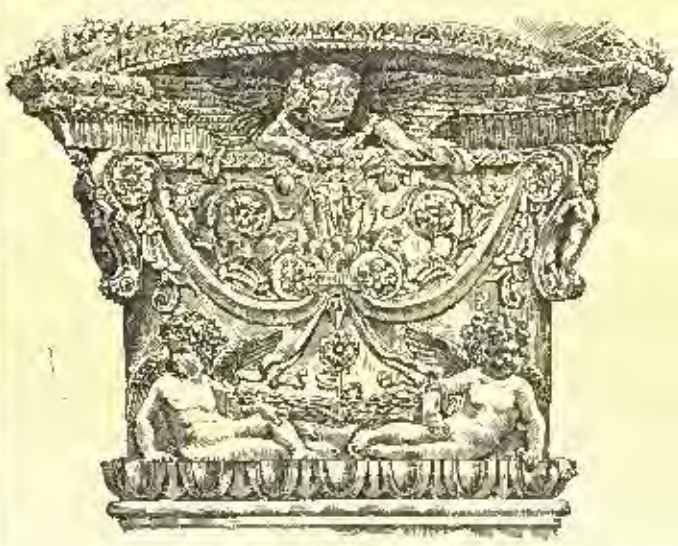

Fig. 2. From the Cathedral at Prato.

these notes — which are the outcome of a personal sketching tour in Italy — is to show that, while the spirit of classic originals can be retained, detail may be infinitely varied, greatly to the benefit of the capital itself, and therefore of architecture and woodwork generally. This statement of purpose will at once suggest that the ruins of the Renaissance form the happy hunting-ground from which I captured the specimens adorning these pages, the most notable of which may be attributed to *la bella Firenze*. But before sporting on the banks of the Arno, I propose to pause for a moment by the Tiber, in just about the spot where Walter de Montreal stood when he gazed on Rome. "Though little skilled in the classic memories and associations of the spot, he could not," says Lord Lytton, "but be impressed

[1] By J. William Benn, Member of the London County Council.

with the surrounding witnesses of a departed empire; the vast skeletons, as it were, of the dead giantess. Now, thought he, as he gazed around upon the roofless columns and shattered walls everywhere visible, over which the starlight shone ghastly and transparent, backed by the frowning and embattled fortresses of Frangipani, half-hid by the dark foliage that sprung up amidst the very fanes and palaces of old — Nature exulting over the frailer art; now, thought he, bookmen would be inspired by the scene with fantastic and dreamy visions of the past. But to me these monuments of high ambition and royal splendor create only images of the future."

In that last phrase we get the *motif* of these notes. "These monuments" are expressly set out here in the hope that they may "create only images of the future," not only in the matter of capitals, but in a hundred other ways. Some architects and designers may be shocked at the statement; but I venture to assert that the majority of modern capitals are monstrous pieces of plagiarism, and the advent of a new composition of any merit is as rare as the dodo. How does this sameness come about? Just in this way: if a capital is wanted, the timid architect or designer hesitates to employ any other than academical examples, and so we get well-known types repeated *ad nauseam*. Some of my purist readers may retort, "Is it not better to follow recognized and respected models, than to run the risk of failure by rummaging in fresh fields and pastures new?" Perhaps it is for the man who is content to remain on the bottom rung of his profession and suffer self-effacement. But the one who desires to impress *himself* on his work is respectfully invited to accompany me to a few famous buildings in the sunny South, in order to consider on the spot, as it were, some capitals setting forth the versatility of the Renaissance, my hope being that a contemplation of these examples may impart to some the necessary courage and inspiration to go and do likewise.

The object, then, of this architectural excursion is to show how various are the details of which capitals can be composed, and how miserable, in the face of such variety, is the vocation of the mere copyist. Though this inquiry naturally takes the student at once to the period of the Renaissance, it must not be supposed that the ancients were fettered, in the designs for their capitals, to the five orders. As I have hinted, we may first pause for a few minutes at Rome, and there it is at once apparent that the Romans were particularly free in their manipulation of the Greek series of forms. For instance, their composite capital showed a determination not to be bound by the academical copy which came from Corinth. And even the composite which the Romans created was further enriched or altered to suit special circumstances. The first sketch to which I draw attention is a beautiful example of this. As a basis we get the genuine composite — the massive Ionic volutes being introduced instead of the somewhat weak tendril-shaped volute — but in the centre a finely-modelled figure, almost worthy of Michael Angelo, appears. And why? Because this noble capital was one of those adorning the columns surrounding the baths of Caracalla; and what "finishing touch" could be more appropriate than the figure of the bather preparing for his plunge? How few modern bathing-establishments have capitals of similar artistic taste and fitness. Alas! none will compare with the magnificence of the Thermæ of Caracalla or Antoniniane, with its numerous statues, which included such treasures as the Farnese Bull, Hercules and Flora at Naples, and splendid mosaics. What a scene to behold; these works of art intermingled with 1,600 bathers! A comparison of the present ruins with what we know must have been the original structure covering thirty thousand square yards, is enough to cause one "to sigh like a schoolboy," as Shakespeare puts it. To notice that such precious relics as the one which is here sketched have been carried piecemeal-fashion to every quarter of Rome, and, indeed, Europe, provokes the exclamation of Mark Antony: "What a fall was there, my countrymen!" This superb capital is reverently sketched just as it is, broken and disfigured, without attempting to restore or imagine any of the missing parts. It no longer surmounts one of the grand columns of the Thermæ, but, when I saw it, was propped up on some lowly brickwork. One of the saddest things about visiting Rome is to see such priceless heirlooms as this cropping up in all sorts of commonplace buildings and unexpected corners, having been stolen from their original resting-places, as stones would be taken from a heap. Such vandalism is enough to upset the equilibrium of the outsider, much more the art-worshipping sketcher. As Lord Lytton truly says: "So common at that day — the time of Rienzi — were these barbarous appropriations of the precious monuments of art, that the columns and domes of earlier Rome were regarded by all classes but as quarries, from which every man was free to gather the materials, whether for his cattle or his cottage, — a wantonness of outrage far greater than the Goths, to whom a later age would fain have attributed all the disgrace, and which more, perhaps, than even heavier offences, excited the classical indignation of Petrarch."

Fig. 3. From the Ducal Palace, Urbino.

Fig. 4.

Fig. 5. From the Cathedral of S. Florido, Citta de Castello.

Happily, this dishonest state of things does not exist now, for the Italian Government jealously guards every such relic of antiquity. Indeed, Young Italy may now sing with Rienzi, though, at present, in not too blatant a strain: —

> "The *Soul of the Past*, again
> To its ancient home,
> In the hearts of Rome,
> Hath come to resume its reign!"

Speaking of these stones of Old Rome, some may urge that nearly all the *details* of the Italian Renaissance can similarly be traced among the remains of the Roman Forum on the Palatine Hill, or among the ruins of the Baths of Caracalla; but one might, with equal reason, contend that the pictures of Michael Angelo showed no advance on those of Cimabue, because the same lineaments and muscles were portrayed. The capitals in the following series, meagrely as they represent the wealth of a subsequent period, will be sufficient to show how, eventually, the dry bones were clothed afresh with vitality. Some critics imagine that the Renaissance is merely an imitative style because it sought its inspiration in the work of the ancient Greeks and Romans, but such entirely fail to understand the new spirit, which, while awakening men to an appreciation of the romance and beauty of the ancient world, also imparted to them a sense of their own individual freedom of thought and design. The beginnings of this revival are noticeable even before the times of Filippo Brunelleschi (1377–1446), but he was unquestionably the architect who gave the new style "a local habitation and a name." It is a deeply-interesting story, which tells how he sustained defeat, at the hands of Ghiberti, over the celebrated Baptistery-gates competition, and went along with Donatello to try his luck in Rome, and more especially to study specimens of the antique which were then being excavated.

Donatello — or to give his name correctly, Donato di Niccolò di Betti Bardi — rather than Brunelleschi, claims our attention just now, for he was one of the earliest of the masters who re-dressed the Classic after the courageous manner which is shown in capital No. 2. Tourists in Italy are apt to be led away by the lions of the land, the great architectural works of Brunelleschi, Bramante, or Michael Angelo, and overlook some of the smaller towns and examples. Such a method of viewing is something like enjoying a grand landscape in its entirety, and foolishly remaining oblivious to the grasses, leaves and flowers which go to make it up. The vast domain of decorative sculpture is full of flowers of thought, whose beauty appeals not only to the architect, but to every student of decorative art. Thus it is that the most delightful lessons can be derived from isolated works in metal, stone, stucco, inlaid (intarsia) or carved wood, which are considered by some as outside the proper range of architecture. How many men who are fairly good in working out the broad lines of a façade, or conceiving a sky-line, fail ignominiously in matters of detail?

But to return to Donatello. He was famous for introducing into his work a naturalistic style which, while erring on the side of harshness, was full of life and character. This capital (Figure 2) from the cathedral of the little town of Prato illustrates this remark perfectly. How he has crowded into this one effort Cupid on Cupid and figure on figure. Why, even the front view of the capital reveals nine figures, large and small, in addition to the bust of the Cupid at the top forming the centrepiece. Just think of it — nine figures in a single capital! Nowadays we consider ourselves lucky if we get a single good head or mask in such a position, much less a figure. Thus it was that these early Renaissance workers seemed to bubble over, so to speak, with genius. Like the flowering of an exotic, they burst forth with a prodigality which was so bewildering in its brilliancy, and likely to be judged in less prolific times as too profuse. But let those purists who would throw stones at Donatello for his ornateness go to S. Antonio at Padua, or study his reliefs on the two pulpits in S. Lorenzo at Florence. Further, let them reverently study his Peter and Mark in the Museo Nazionale of the same city. The latter are in bronze, as is also this capital which adorns the cathedral at Prato, a place rich in examples from the artists of the early Renaissance — Donatello, Michelozzo and Andrea della Robbia. I have purposely placed this first because it represents that liberty of treatment, the admiration and cultivation of which are the main objects of this imaginary sketching tour. Those who understand the difficulties of working in bronze will most appreciate the *technique* of this effort. Not a few of those Italian bronzes put the best of modern efforts "on their mettle." Some may perhaps think this remark to be over-praise. If so, let such gaze on Donatello's famous Victorious David in Il Bargello, and I will repeat in their presence Macaulay's lines:

"And *he* made a molten image
And set it up on high;
And there it stands unto this day,
To witness if I lie."

Taking Donatello's capital as indicating the beginnings of this great resurrection of art — he died in 1466 — we must now borrow from a beautiful building which was erected two years after his death in the city of Urbino, the place claiming the immortal Raphael as a son. I refer to the much-admired Ducal Palace erected there by the famous Federigo Montefeltro. Capitals, or rather brackets, Nos. 3 and 4, are samples of many others put there by Francesco di Giorgio, of Siena, and Ambrosio Baroccio, an ancestor of the painter. Herein we find a marked contrast to Donatello's prolific effort. In No. 3 the designer confines himself to simple Grecian details, the rams from a sacrificial altar, etc., but he disposes of them in a new way, and the result is a bracket of marked restraint and quiet beauty. May I pause here to suggest to the modern designer who would follow on these lines, and yet not stultify himself as a mere copyist, how it is to be done? Let two other animals equally graceful take the place of the rams — say, rabbits or dogs — greyhounds or any other breed — some local leaves be substituted for the acanthus and honeysuckle, and the thing is individualized without being ostracized as "outside the range of the styles." In No. 4 there is more departure from strict Classic lines shown. The curious twist of the eel-like scrolls at the corners, the placing of the facial rosette, the hanging of the husk festoons, all show independence of thought. The introduction of the trident and the dolphins in the tail of the bracket, and the hanging of a couple of shields by the ribbon are decidedly happy, the latter suggesting the action of Icilius when he

"Sprang upon that column, by many a minstrel sung,
Whereon three mouldering helmets, three rusty swords, are hung."

Here again there is a wealth of suggestion to the designer anxious for change. Anything, from fishes to flowers, served as effective detail for this designer of Urbino.

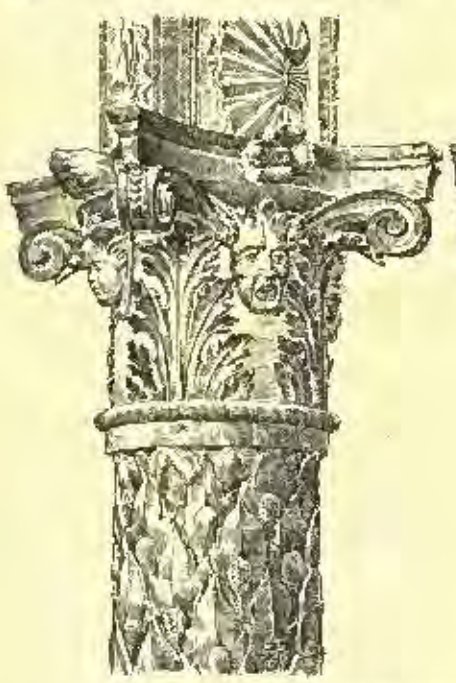

Fig. 6. From Sta. Maria Maggiore, Spello.

Fig. 7.

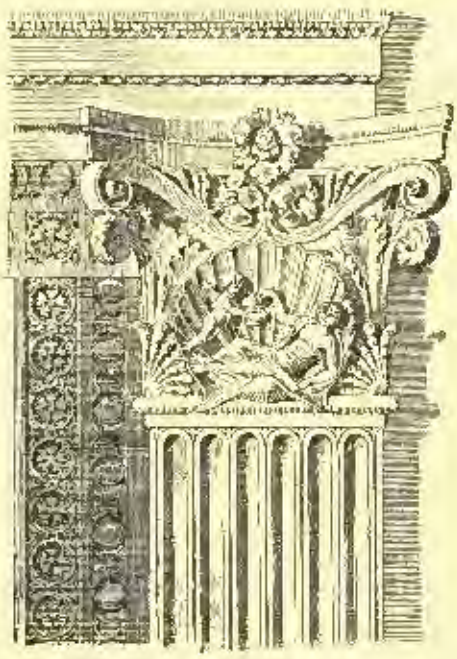

Fig. 8. From the Palazzo Vecchio, Florence.

The next sample, No. 5, is one of several in the Cathedral of S. Florido at Città de Castello, in the upper valley of the Tiber. The building, an admirable specimen of the Renaissance style, was begun in 1482 and completed in 1522. Bramante is generally credited with being the builder, but the records mention Lombardo as the architect. It is interesting to notice that if any family achieved eminence at this period it generally spent the greater part of its resources in building. The history of the Vitelli, the lords and masters of Città de Castello, show how vehement was the rage for bricks and mortar, or rather marble and stone, for they erected and embellished no less than four palaces to commemorate their name and culture. It is a pity that our modern princes, merchant and otherwise, are not more moved to leave behind them such "footprints on the sands of time." The capital which causes our present detour to this out-of-the-way Perugian town is remarkable for its simplicity. Its details are within the grasp of any carver who has mastered the acanthus leaf, and yet it is not commonplace or strictly academical. It shows that by taking a little trouble, ordinary stock materials can be regrouped with the happiest of results. Those, then, who shrink from attempting the task of evolving a capital filled with figures, like that of Donatello, may run upon the easier lines of this simpler effort.

To brace up the faculties of any who imagine that the designing of capitals begins and ends with the refined sort of thing figured in No. 5, I shall now proceed to the little town of Spello in order to study some lively capitals which there adorn the Cathedral of Sta. Maria Maggiore. They are shown in sketches Nos. 6 and 7, and exhibit to perfection the happy liberty in which the early Renaissance artists rejoiced. While adhering to the main lines of the Classic, they seized anything — masks, grotesque heads, festoons and a thousand other things — to secure effect. In No. 6 we get masks of various men, and in No. 7 heads which might answer for court-jesters or chimerical creatures. These capitals are not perhaps "pretty," but

they are full of life, and in that respect stand head-and-shoulders above many timid compeers. A feature which is distinctly Renaissance in character occurs on these columns, and that is the elaborate decoration of the shafts. In this respect the Italians of the fifteenth and sixteenth centuries made a new departure. Discarding the simplicity of Classic orders, they produced shafts of great beauty, and the two distinct types of treatment which are here shown will reveal the early form in which such florid ideas developed. The choir in the Cathedral at Spello contains a magnificent canopy in the early Renaissance style which is full of suggestion to the student of this epoch. These two examples will indicate the inspiring character of the work which is to be found in this corner of the sunny South.

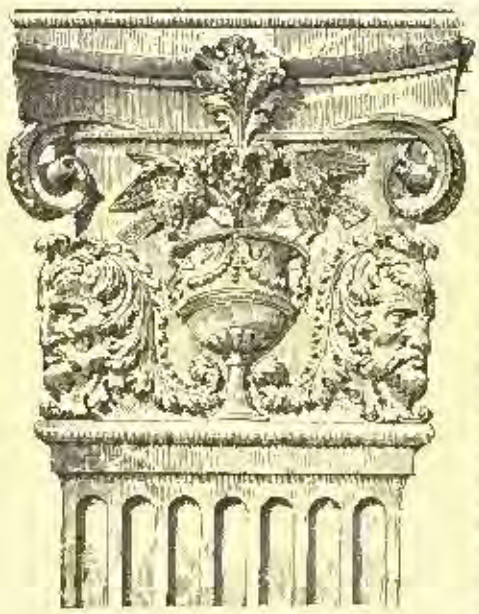

Fig. 9. From S. Spirito, Florence.

One may pick up all sorts of captivating little bits while wandering in the byways of Italy; but, after all, Florence is the centre of most interest to those who care to follow up the subject in hand. Both as regards intellectual and artistic life, the great art city of Tuscany succeeded during the Middle Ages in eclipsing even Rome itself. While the Imperial city seemed ever affected by the dead hand of Cæsar, its rival on the Arno rose, Phœnix-like, from the ashes of former greatness, and exhibited a vitality which has never been excelled in the world's history. As Leo charmingly puts it, "Here everything betrays the work of generation after generation of ingenious men. Like a water-lily rising on the mirror of the lake, so rests on this lovely ground the still more lovely Florence, with its everlasting works and its inexhaustible riches. From the bold, airy tower of the palace, rising like a slender mast, to Brunelleschi's wondrous dome of the Cathedral; from the old house of the Spini to the Pitti Palace, the most imposing the world has ever seen; from the garden of the Franciscan Convent to the beautiful environs of the Caseine—all are full of incomparable grace. Each street of Florence contains a world of art; the walls of the city are the calyx containing the fairest flowers of the human mind; and this is not the richest gem in the diadem with which the Italian people have adorned the earth."

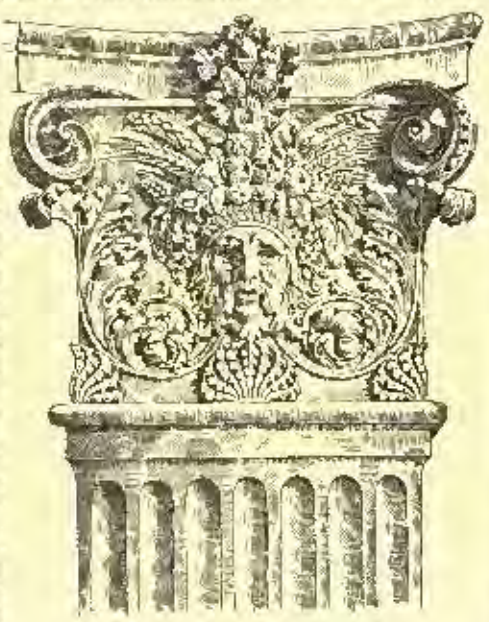

Fig. 10. From S. Spirito, Florence.

We will to Florence, then, for the rest of our specimen capitals, and, as in duty bound, first call at the Palazzo Vecchio, to whose "bold airy tower" Leo so poetically alludes. It was at one time the residence of Cosimo I, but now used as a town-hall and museum, and contains a number of halls decorated by various eminent Italian artists. One of them, perhaps the most famous, is enriched with beautiful marble doorposts by Benedetto da Majano, and sketch No. 8 shows one of them. The same gifted artist executed the intarsias of Dante and Petrarch, which are so generally admired. This example is mainly useful in the present series by way of showing that an episode may be figuratively set out on the face of a capital without detracting from its beauty or disturbing its proportion. Here Cupid is ministering to the wants of Venus, the whole scene being fitly confined within the limits of a shell. The upper part of the capital, while running much on Classic lines, shows a feeling distinctly its own. Notice the floral terminals of the inside ends of the volutes; how nicely they fill in the interstices. Benedetto da Majano could certainly handle ornament as well as figures.

The tour in search of suggestive capitals may well and pleasantly be brought to a conclusion by considering four specimens from the pencil of that architect in whom the beauty of the Renaissance has been truly said to have culminated. I refer to Jacopo Tatti, more commonly known as Sansovino, whose life's work was done between the years 1479 and 1570. This architect must not be confused with Andrea Sansovino (1460–1529), the sculptor of the marvellous groups of Christ and the Baptist in the Baptistery at Florence, and other fine works at Rome. Jacopo Tatti was a Florentine by birth, and had the good fortune to receive his education in that city during one of its most art-inspiring periods. Like most young Italians possessing genius, he had a roving temperament, and so we find him working at Rome, and eventually at Venice, which city will owe him a lasting debt of gratitude for the "Stones" which he left there. It was not until I had an opportunity of gazing upon the beautiful façade of the old library of St. Mark's, and the masterly details of the Giants' Staircase at the Doge's Palace, Venice, that I at all understood the wonderful genius of this Sansovino, or the part which he occupies in this culminating period of the Renaissance. Bramante's epoch of what may be described as "symmetrical construction" was succeeded by a style in which the chief aim was general effect. Harmony among the individual members began to be neglected, and the eye was arrested by boldness of construction and striking contrasts. As I have tried to make clear in the study of these capitals, new modes of expression were borrowed from antiquity, the axioms of which had formerly been applied in a manner which was unsympathetic. This culminating period had for its exponents Raphael, Baldassare Peruzzi, the younger Antonio da Sangallo, of Rome, Michael San Micheli, of Verona, Michael Angelo, and last, but not least, Jacopo Tatti Sansovino, who was the designer of the four Florentine capitals to which these prefatory notes are intended to draw attention.

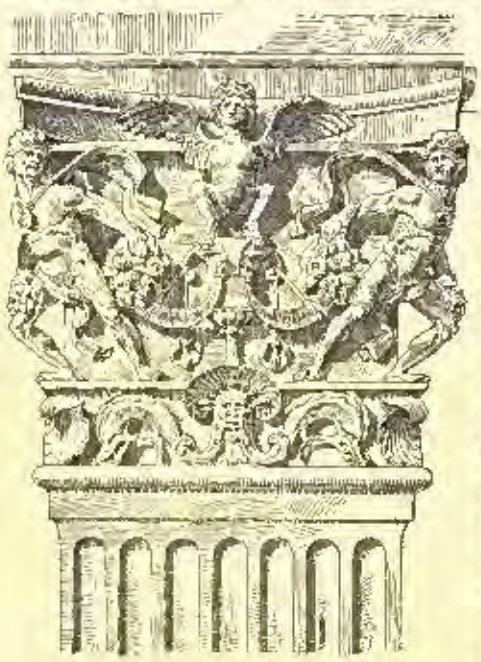

Fig. 11. From S. Spirito, Florence.

Fig. 12. From S. Spirito, Florence.

The Church of S. Spirito at Florence, where these capitals are to be found, has the fame which comes of being originally designed by Filippo Brunelleschi. It is one of the most attractive churches in the city, mainly on account of the noble proportions of its interior, which is borne by thirty-one Corinthian columns and four pillars.

But, to the ornamentist, there is nothing in the church which is likely to prove of more interest than these two Sansovino studies. It will be observed that these are all antæ or pilaster capitals, and as such they are likely to be of special service to wood-workers, as well as architects. It is not often that the full column appears in wood, while the flat or fluted pilaster is in constant requisition. No. 9 of these S. Spirito studies is chiefly noticeable on account of the masks which finish the corners. Here was a striking departure in such a case, and one which required a good deal of courage. Perhaps the Classic authority that Sansovino had in his mind when he designed it was the Corinthian capital of the temple of Apollo Didymæus, at Miletus. The idea of placing a vase in the centre of the capital is common enough, but there is rare artistic judgment in showing it "on the round," as the article would appear if thus placed.

Sketch No. 10 shows another application of the mask. This time it occupies a central position, and is crowned with a profusion of the "kindly fruits of the earth." The decorative placing of the wheat-ears and the crowning of the whole by the acorn are points which should not be passed over by the thoughtful observer. Further, the way in which the beard is made to blossom, so to speak, into the acanthus scrolls at the sides is delightfully artistic. In both these examples Sansovino has deemed it necessary to introduce volutes to finish the top-corners of his capitals, and the way in which they are pulled out from the moulding is not altogether graceful. In Sketches 11 and 12 he abandons that remnant of the Classic, and boldly uses detail of his own selection. No. 11 is a striking instance of this. The pair of athletes springing from the corners give a spirit and contour to the capital which are seldom met with. The decorated band on which the figures stand, with its shells and dolphins, is another feature showing liberty and originality. The mystic chimerical conception in the centre is more queer-looking than captivating, but the whole thing suggests a hundred ways in which the designs of our capitals can be refreshingly varied. It does not follow that the modern artist need put Florentine athletes into his design. Let him, if he so pleases, put a couple of cricketers, or footballers, and fill-in the interstices with the implements of the play, surmounting his capital with the prize-cup which the players are supposed to have won. Or, if the capital be for a theatrical purpose, let a couple of Harlequins hold the corners, while Columbine graces the centre. Anything to get away from the slavish copyism which is the bane of so many buildings.

In the last of the Sansovino capitals, the ever-favorite subject, the infant form, is selected as the *motif*. The graceful pose of the little fellow, the way in which he is supported by cornucopiæ, and the balance of the entire thing, leave nothing to be desired. In the whole range of the figure subjects there is no study more profitable to the student than that of Master Cupid. He will invest many otherwise lifeless bits of decoration with a charm which no amount of inanimate ornament can impart.

The summary of the suggestions which these capitals have to make to the student is: "Anything in the world of Nature can be pressed into your service." In this brief series of a dozen capitals — just a few from the many thousands which adorn the churches and palaces of Italy — we have figures ranging from the Roman bather at the baths of Caracalla to the fruit-surrounded Cupid of Sansovino. We have animals, birds and fishes; leaves, fruit and flowers; masks, armor, and pottery; things as diverse in nature as can be imagined, but all made harmonious and beautiful under the influence of the life-inspiring Renaissance. What should we have heard of Sansovino, or any one else of the noble Florentine school, if they had spent their lives in merely copying the detail — admirable as it is — of the ancients? Certainly very little. Then let the ornament of each epoch, even if founded on much the same foundation-lines, tell its own tale to the lasting credit of those who, like Sansovino, are determined to speak for themselves in the art which they make their own.

There is just another point on which I should like to animadvert before leaving the consideration of these Sansovino capitals, and it has to do with the public more than the student. It is clear, I think, from these examples thus brought, in a fragmentary way, from sundry towns in Italy, that the patient student may possibly become a master-ornamentist if he can only study on the same lines, and catch a similar spirit, as his Italian predecessors. It will occur to some of my readers to sigh and inquire: "What chance has the needy art-enthusiast of these times to do any such thing?" It may be admitted at once that, unless he is greatly aided in some way or other, he is, to say the least, heavily handicapped. Then how shall he be assisted in his art-career? Simply in this way: Let any place aspiring to the style and title of town or city set about establishing its school of art, amply supplied with the best models. Let it, if it be possible, have a pleasant garden adjoining, with a colonnade, S. Marco-like, running round, so that study can proceed out-of-doors in the summer-time; and let the alcoves and niches be redolent with flowers, and filled with casts of Classical sculpture and statuary. To such an elysium invite a number of picked art-workers — young men and women who "mean it" — to gather and revel over precious lines of antiquity, and vie with each other in the pleasant task of re-dressing old forms with new beauties. A truly pleasant picture; but who is to pay for it? Let it be paid for out of the rates, and hold any place which will not provide such an art-school up to public opprobrium. "What a Quixotic idea!" the majority of my readers will exclaim. "No town-council or rate-payers would hear of it."

Then let us inquire how they managed in old Florence during the days of young Sansovino. *Experientia docet*, said the old Romans. Thanks to the help of that prince among art-patrons, Lorenzo de' Medici, the aspiring Florentine could attend art-gardens expressly provided by his ruler, and there, among the choicest antiques the world has ever seen, study and model to his heart's content under proper tutors. By thus surrounding these young men with the remains of the ancient masters, Lorenzo succeeded in educating their views beyond the forms of common life up to that ideal beauty which alone distinguishes works of art from mere mechanical productions. And best of all, these rare privileges were not confined to those who could afford the luxury of spending time over unproductive art-study — but, will it be believed? — when students were too poor to lose time, Lorenzo de' Medici *not only paid them competent stipends* while they attended to their studies, but offered considerable money-prizes as incentives to proficiency! What has your cheese-paring town-councillor to say to that? Wise is the modern municipality which takes a lesson out of the history of the Medici, and deals in the same large-hearted way with the questions of art and technical training for its sons. Look at the harvest of genius Florence reaped from the seed thus judiciously sown by the far-seeing Lorenzo. If only more of our machine-made wealth were spent in paving for earthly paradises after the glorious model of Lorenzo de' Medici next to the monastery of S. Marco, we should not give cause to those croakers who are constantly protesting that art died in Italy some centuries ago. Let our young men have the chance, and I believe that if we are to see no more Raphaels or Michael Angelos, we may manage to raise some modern Sansovinos.

BUILDING LAW

FUTILITY OF CERTAIN COMMON CLAUSES IN BUILDING CONTRACTS.

THE case of Bartlett *vs.* Stanchfield, just decided by the Supreme Court of Massachusetts, shows the uselessness of that very common clause in building contracts prohibiting all claims for extras unless ordered in writing. The contract involved in this case contained the following clause:

"And it is further agreed that, should the owner, during the progress of said construction, request any alteration of, addition to, deviation from or omissions concerning the construction of said houses, as set forth herein and in said plans and specifications, the same shall be made by the said Bartlett, and shall in no way affect this agreement, but shall be added or deducted from the amount thereof by a fair and reasonable valuation, and that no charge shall be made for extra work or materials unless the same is ordered in writing and the price thereof agreed upon."

The orders for extras were given by word-of-mouth, and not in writing. The Court held that such orders were binding on the owner, notwithstanding the terms of the agreement; and Mr. Justice Holmes, in delivering the opinion of the Court, uses the following language:

"Attempts of parties to tie up by contract their freedom of dealing with each other are futile. The contract is a fact to be taken into account in interpreting the subsequent conduct of the plaintiff and defendant, no doubt. But it cannot be assumed as matter-of-law that the contract governed all that was done until it was renounced in so many words, because the parties had a right to renounce it in any way and by any mode of expression they saw fit. They could substitute a new oral contract by conduct and intimation, as well as by express words. In deciding whether they had waived the terms of the written contract, the jury had a right to assume that both parties remembered it and knew its legal meaning. On that assumption, the question of waiver was a question what the plaintiff fairly might have understood to be the meaning of the defendant's conduct. If the plaintiff had a right to understand that the defendant expressed a consent to be liable, irrespective of the written contract, and furnished the work and materials on that understanding, the defendant is bound. — *West* v. *Platt*, 127 Mass. 367, 372; *O'Donnell* v. *Clinton*, 145 Mass. 461, 463."

SOCIETIES

BOSTON ARCHITECTURAL CLUB.

THE Boston Architectural Club held a conversazione, Thursday evening the 28th, to discuss the Exhibition of Stained-glass and Tile Work which has been held in the rooms of the Club during the past ten days. The attendance was quite large and a great deal of interest was manifested. Mr. C. Howard Walker presented a very able and clear-sighted consideration of the subject of stained-glass, touching somewhat upon the history of the art and the

processes of manufacture, illustrating the gradual development in its use from the Byzantine mosaics to its perfected application in the Gothic cathedrals, noting the modern and more miscellaneous treatpointing the moral to the subject by reference to a few of the excellment of stained-glass, glass-mosaics, enamels, etc., and, indirectly lent examples on exhibition.

Mr. J. G. Low was expected to address the Club on the subject of tile-work, but was prevented by sickness from being present. Mr. A. E. Streeter, who is associated with him in the Chelsea Tile Works appeared in his stead, and gave a very interesting account of Mr. Low's early attempts at the manufacture of artistic tiles and pottery, the difficulties which he encountered and some of the means by which he had brought his work to so high a standard. Prof. E. S. Morse also spoke upon the subject of tile-work, urging the necessity for more men in this country who would do just what the Lows have done, bringing an artistic training and thorough good taste to bear upon a subject which has never yet received sufficient attention with us.

The Club has every reason to congratulate itself at present. The membership is large and constantly growing by the addition of some of the best men, both in the profession and in the allied arts. There are no debts, a very general enthusiasm, full classes for study, and every indication that the organization will accomplish all that its friends hope for it.

COMMUNICATIONS.

THE PRESCOTT DOOR-HANGER.

Chicago, Ill., March 12, 1889.

To the Editors of the American Architect:—

Dear Sirs,—In looking over the files of your paper we have chanced to notice in the article on "Builders' Hardware," of November 10th, the following sentence in reference to the "Prescott Sliding-Door Hanger." "The only objection to their use for sliding-doors is that they have to be put on before the plastering is applied and they are somewhat less easily adjusted." We have used a large number of these hangers because the very opposite of this is true in regard to them.

The greatest difficulty with the running of sliding-doors is not in the hanger but in the track. Almost any hanger in the market will run well if the track is perfect. With the settling of the building, and shrinkage of woodwork, added to poor workmanship, the double tracks usually applied for parlor-doors are very apt to get out of adjustment, and then the best hanger will not work and there is no remedy except to tear off the plastering and reset the track.

After trying one form and another of hanger we concluded that the only sure remedy was to abolish the track altogether. With the Prescott hanger there is no track. The hanger is applied to the jamb on one side of the sliding-door after the plastering is completed and the interior finish in place.

The hanger is screwed to the jamb and covered by a wide stop. It can be adjusted by taking off the stop and altering the set of the hanger. To be sure this is a more difficult operation than adjusting the set of the ordinary hangers, but when the Prescott hanger is adjusted, everything is adjusted, while with the wheel-hangers the fault is most likely to be with the track and no adjustment of the hanger itself will help matters.

The Prescott hanger is especially useful therefore with very narrow and high doors which are almost certain to give trouble when hung in the ordinary manner, because the two hangers on the top of the door must be set so close together that a slight inequality in the track will throw the bottom of the door out of adjustment and a sudden push at the bottom of the door will cause the wheels to jump. With the Prescott hanger the door can never jump no matter how the pressure may be applied.

Very respectfully, Patton & Fisher.

THE OWNERSHIP OF DRAWINGS.

Savannah, Ga., March 26, 1889.

To the Editors of the American Architect:—

Dear Sirs,—I write to ask the opinion of your law editor in regard to the following case which has just occurred in my practice, and being the first of its kind in my experience, greatly surprised me.

Mr. G—— having entrusted me with the duty of preparing plans and specifications for a residence, which I was also to superintend, everything was prepared, and bids received, and the contract awarded last Wednesday. Meantime the form of contract was to be drawn up by me, and to be signed by owner and contractor when ready. Yesterday evening he came to the office to sign the document, but on reading it over, remarked that it was all right with the exception of one thing. Asking what the objectionable thing was, he replied that he objected to the clause referring to the drawings which read, "And it is further mutually agreed that all drawings and specifications are and remain the property of the architect," and refused to sign unless this was scratched out, or changed to read, "are and remain the property of G." I explained that it was the custom the world over for the architect to retain his drawings, as they were but a means to an end, his tools, as it were to build the house, the same as the carpenters' tools, etc. But he replied that he was to pay for them and wanted them, had consulted a lawyer, who told him that they were his, and demanded his rights. I showed him rolls of drawings, the accumulation of ten years' practice, in the office, of works built and paid for, but it was no use, what he paid for was his.

Now I wish to know as a matter-of-law-and-fact, is he right, and would the Courts sustain his claim for the drawings, after the completion of his house. Very truly yours, J. J.

[If the owner signs a contract providing that the drawings are to be the property of the architect, he of course cannot claim them. If nothing is said about this point in the agreement between him and the architect, he can probably, as the law now stands, demand them of the architect and get them. The leading case on the subject is the celebrated one where the British Government demanded the plans of the Westminister Palace from the heirs of Sir Charles Barry. The Barry family fought bravely for professional rights, but, after incurring enormous expenses were defeated by the decision of the highest Court, and the decision has ever since served as a precedent. Among architects it has been universally denounced as unjust, and the exclamation by which the Lord Chief Justice is said to have summed up his opinion—that he "would not hear of it, that a man should not have what he had paid for," is certainly the worst example of *petitio principii* recorded in legal history, but, with a few exceptions, English and American judges have always followed it, and no individual architect can afford to struggle against the mass of precedents which would be opposed to him. If the owner really wishes to preserve the drawings, and thinks he can do so better than the architect, it is cheaper to trace them than to fight with him; if he is one of the kind that demand the surrender of the drawings with a view to cheating the architect out of a part of his pay, the most profitable course is to have nothing to do with him.—Eds. American Architect.]

NOTES AND CLIPPINGS.

Bellite Experiments.—A series of experiments were successfully carried out recently at Chadwell Heath, Essex, with a new explosive, bellite. This explosive is the invention of Mr. Carl Lamm of Sweden, in which country it is well in use both for mining and military purposes. Bellite is composed of di-nitro-benzole and nitrate of ammonia blended together in certain proportions and under special conditions. The experiments, which were conducted by Mr. C. Napier Hake, F. I. C., and Mr. Perry F. Nursey, C. E., were commenced by exploding 1½ pounds of bellite under water, a fine column of spray being projected to a great height. Half a cartridge of bellite was then placed on a coal fire, and was simply roasted away. The corresponding half was then exploded by means of a capped fuse on a piece of three-eighths-inch boiler plate with good effect. An iron weight of 120 pounds was then dropped from a height of 15 feet onto some naked cartridges, which were crushed but not exploded. The crushed cartridges were afterwards exploded on a piece of double-headed rail, out of which was cut a short length. In a hole in the earth one pound of bellite cartridges was mixed with one pound of blasting gunpowder, and the powder was fired, the explosion throwing the bellite cartridges out of the pit in a broken and partially roasted condition. A cartridge of bellite was then fired from a rifle against an iron plate, the bullets being merely smashed against the plate. Some comparative experiments made with equal quantities of dynamite and bellite exploded on iron plates showed that bellite was slightly stronger than dynamite, and that it had more of a rending than of a smashing action. As a test of its propelling power a 32-pound ball was projected from a mortar to a distance of 120 feet by a charge of one-half ounce of rifle powder, but with one-quarter ounce of bellite it covered 285 feet in its flight. The final experiment consisted in demolishing a railway. To this end a sixty-foot length of line was laid, with a double-headed rail carried in iron chairs on timber cross-sleepers. A mine containing eight pounds of bellite, placed in the earth at a depth of five feet below the railway, was exploded, demolishing the railway and forming a crater twelve feet in diameter by some six or seven feet deep. Portions of the line and sleepers were projected many feet away, and the scene was one of perfect wreckage. The experiments fully demonstrated the safety, power, and special action of bellite.—*London Times, February 8.*

Wilmerding, Pa., a Model Town.—George Westinghouse, proprietor of the air-brake patent, which made him wealthy and famous, proposes to build a town for his employés at Wilmerding, near Allegheny, Pa. He has bought 600 acres of land, and will spend $3,000,000 in improving it. A new machine-shop, costing $1,000,000, will give employment to 5,000 hands, and turn out five times the work done at the present mills in Allegheny. The place is to be modelled after Pullman, Ill. There are 42 plots in the town site, each containing a number of lots. One of them will accommodate a fine hotel and a handsome club-house, to be built together, and to form the most pretentious structure architecturally in the new city. Lots that are not taken by employés or others by a certain date will be built on by the company. About two hundred houses are now under way. The improvement company has bought 625 feet of frontage on the Monongahela River, near Fort Perry, to establish water-works capable of supplying 20,000,000 gallons a day. Sewers are now being laid in every street, and natural-gas will be used exclusively for fuel.—*Springfield Republican.*

S. J. Parkhill & Co., Printers, Boston.

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BOSTON ATHLETIC ASSOCIATION'S BUILDING.—THE GYMNASIUM.

J. H. STURGIS [STURGIS & CO., Successors,] Architect.

HELIOTYPE PRINTING CO. BOSTON.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 694.

APRIL 13, 1889.

Entered at the Post-Office at Boston as second-class matter.

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A VERY damaging admission was made by a witness at the recent session of the Ceiling Investigating Committee at Albany. The witness was one of a firm of dealers in glass, and testified that he sold glass to Snaith, the contractor, for the ceiling, at three dollars a foot, with an arrangement by which a bill was rendered for it at the rate of six dollars a foot, so that it might appear that Snaith actually paid that price for it. In the present case the bill at six dollars seems to have been made out at the request of Snaith, after he got into difficulties, with the hope that it might help him to frame a plausible explanation of what he did with all the money that had been paid him; so that perhaps the glass dealers should be reproached with nothing worse than an over-zealous readiness to concoct fibs to help one of their customers out of a scrape; but the same sort of trick is used in other branches of the building trades to an extent which would surprise outsiders. In altogether too many cases the bills, receipts and vouchers presented to architects as evidence for the settlement of accounts are very far from showing what was actually paid for the goods charged on the bills, and none of the architect's duties require more labor and experience on his part than that of finding out what the true net price of materials used in building is. The habit of keeping up "long" prices, as a means of deceiving the inexperienced or unwary, while the goods are really sold at a fraction of the prices marked on the bills, seem to be chargeable mainly to the wholesale dealers. Of course, they do not use the trick against their own customers, all of whom understand it, but the fact remains that it provides those who buy of them with a means of deceiving those to whom they sell again, and the wholesale dealers seem to think that this inducement will bring them customers. Perhaps it does, but they must be of the poorest kind, while the honorable men, who make out their day-work bills with the real prices, ignoring the list prices altogether, find the lists simply a nuisance. They are really worse than that to them, for there is no question that the suspicion entertained by owners, that they are likely to be robbed in some such way, leads them to put many thousands of dollars' worth of work out to contract which would otherwise be done by the day, with much more satisfaction to them and to the mechanics employed. Nothing is more common in architects' offices than to hear inquiries made about the price of certain materials. Some price is mentioned, or looked up in the lists, and the architect is asked whether it is the net or the list price, and if it is the latter, how much discount there is. As the discounts vary according to circumstances, he can rarely tell what will be the exact net price that his client can get the goods for, and the latter concludes by saying that it will be better to put his work out to contract, so as to secure by competition, not so much the lowest price for the labor, as for the materials employed.

THE proceedings of the Lydecker court-martial seem likely to be of considerable interest, if not importance, to architects. The charge against Major Lydecker is that he failed to do his duty in supervising the construction of the Washington Aqueduct, so that the Government was defrauded out of a large amount of money by the dishonesty of the contractor, and was left with a useless piece of work on its hands. It seems clear that he did not visit the interior of the tunnel very frequently, and the question appears to be whether this circumstance justifies the people concerned in letting the contractor go in peace with his ill-gotten gains, and visiting all the consequence of his rascality on a person of whom the worst that can be said is that he did not discover the tricks that were being practised. This is a question which concerns architects very closely, and, as a contribution to the discussion, the testimony before the court-martial of General Newton, for many years charged with the supervision of the most important Government works, is of importance. General Newton testified that an officer appointed to superintend operations like that of the construction of the aqueduct tunnel "could never prevent fraud by any possible personal inspection which he might make." "Whether Major Lydecker visited the tunnel more or less often did not affect the question at issue, for he could never have visited it often enough to have prevented frauds if the workmen desired to do defective work, and the sub-inspectors were incompetent or unreliable, for all traces of fraud could be covered up." "In the case of the New York Aqueduct," General Newton said, "although there were a number of inspectors, the cheater had got in, and the discovery of the fraud was quite accidental." How different this is from the usual talk on the subject, architects can well appreciate. According to many clients, the principal use of an architect is to enable his employer to put in a "cheater" to build his house, and to hold him responsible for all the cheater's frauds that he does not succeed in preventing, and lawyers are never more eloquent than when they explain that an architect, who "holds himself up as the head of the building profession," is accountable to the owner for all defects in work that he "assumes to supervise."

ARCHITECTS in New York will regret the retirement of Mr. Albert F. d'Oench, who has resigned his post as Chief Inspector of Buildings, to engage in professional practice as an architect. Mr. d'Oench has held his responsible position for about five years, to the satisfaction of the profession and the public. Under him, it is needless to say, there have been none of the scandals which have at times cast discredit on the office, and the criticism of plans, which forms an important part of the New York Inspector's work, has been done with a comprehension of the conditions to be fulfilled which saved much misunderstanding and annoyance. Mr. Brady, his successor, has been long in the Bureau as a subordinate, and is spoken of as a hard-working and capable man.

PHILADELPHIA has just lost a very worthy citizen, in Mr. Walter Allison, who died a few days ago at the age of seventy-three. Mr. Allison was one of the builders of the old school, who have done so much for the credit and prosperity of the communities in which they have spent their active days. He was born in Philadelphia, when Philadelphia was a pleasant, patriotic town, with no thought of railroads or steamboats, and very little of manufactures. His father was a well-to-do carpenter, and the boy was sent to school, and then apprenticed to a book-seller. He soon left this occupation, and took up that of his father, and at the age of twenty-six began business on his own account. From that time until his death he lived in Philadelphia, engaged first in his own affairs, and afterwards, as he became better known, in services to the public. He was for three terms a member of the City Council, and had been a member of the Board of Health, and a director in many other administrative or charitable bodies.

THE Master Builders' Exchange of Philadelphia has decided to establish a complete set of trade schools, in which shall be taught all the principal branches of the art of building. A school of plumbing has been in operation under the same auspices for about five years, with encouraging success, and will be included in the more comprehensive scheme now being carried out. Although the Exchange has taken great interest in the matter, and will undoubtedly do all that it can to insure success, the real originator and supporter of the enterprise is that unwearied friend of the American workingman, Colonel R. T. Auchmuty, of New York, who has offered to contribute three thousand dollars a year toward the expenses of the school for three years, after which it is hoped that it will be self-supporting. Colonel Auchmuty has, it is said, proposed to the Master Builders' Association of Boston to do the same for promoting the establishment of trade schools in that city, and it is altogether likely that his offer will be accepted.

THE Eiffel tower in Paris is very nearly finished, and will certainly be completed by the first of May. The painters have for some time been at work decorating it, and the Parisians naturally take great interest in their labors. With the usual French ingenuity in seizing opportunities for exalting the memory of persons whom they wish to honor, the directors of the work diversified the decoration by having the names of distinguished personages of the last century painted in conspicuous places. This pleased the spectators, until it appeared that some of the most honored names were omitted. The omissions were so glaring that they could not be overlooked, and inquiry was made as to the cause. It then appeared that the names had to be painted in panels of a limited size, none of which would contain a long name, painted in letters large enough to be read from the ground, and the directors were, therefore, obliged to restrict the honors to be bestowed in this way to persons whose names were not more than six or seven letters long. Persons who visit the exhibition should, therefore, remember, as they study the names of the illustrious dead on the great tower, that the list does not comprise all the most distinguished ones, but only those with the shortest names.

THE Paris Exhibition is to be enlivened by four splendid entertainments, which are to be provided at the joint expense of the State, the city of Paris and the Exposition funds, at a cost of six hundred thousand dollars. The first of these is to take place on the fifth of May, the one hundredth anniversary of the meeting of the States-General that became the Constituent Assembly, which is to be celebrated at Versailles with a grand banquet for fifteen hundred guests in the Galerie des Glaces. The second entertainment takes place the next day on the Exhibition grounds, when the buildings are to be opened for the first time to invited guests with ceremonies appropriate to the inauguration of such an affair. The third is on the fourteenth of July, the anniversary of the taking of the Bastile, when all Paris is to be illuminated with a splendor unusual even for the French Fourth-of-July, the Boulevards are to be lighted with strings of lamps, and the Bois de Boulogne and the Forest of Vincennes are to be included in the illuminations. The last affair of the kind is the festival of the inauguration of the monument of the Republic, by Dalou, which is to stand in the Place de la Nation. The date of this is not fixed, except that it is to take place some time in September.

TWO new colors are described in various recent technical journals. The first is apparently a reproduction of a color known to the ancients, and made by them with sand and lime, heated with roasted copper. The pigment, on analysis, appears to be a compound silicate of lime and copper. It is now made with exact proportions of the materials, so that the product is uniform, and the process seems likely to furnish us with a material of great value. The color is a bright, greenish blue, so that it will be more available for decoration than French blue or cobalt blue, both of which are of a purplish cast, and do not mix well with other colors, while it appears to be as permanent as either of them. The other color is a black, which has been made by treating camphor with sulphuric acid. By steeping camphor in strong sulphuric acid a jelly-like mass is formed, of a reddish color. When this is heated it boils, giving off fumes of sulphurous acid, and turns intensely black. By evaporation the unconverted excess of acid and camphor is driven off, and a black mass remains, which seems to have the qualities of Indian ink. Like Indian ink, it can be apparently dissolved in water, and remains suspended for a long time. We hope that some one will pursue the subject of this camphor-black. A pure liquid black is one of the things that science has searched for in vain for many years, and even so near an approach to it as good Indian ink would be a most useful substance.

AN architect in Paris has recently been made to feel the weight of professional responsibility in a rather disagreeable way. Being commissioned to take charge of the erection of a house in one of the new quarters of the city, he made his plans and commenced the construction of the building before the grade-lines of the street had been given by the city engineer. His drawings had been made for a high and spacious carriage entrance in a portion of the front where variations could be made in the grade without inconvenience, but the proprietor, who had a second-hand pair of doors that he wanted to utilize, directed him to make the doorway very small, to fit the dimensions of the doors, and to place the entrance in another part of the front, where changes could be made only with difficulty. The architect followed these directions, instead of protesting against them, as he should have done, and was, moreover, so careless as to allow the door-sills to be set either before the grade-lines had been given, or without properly referring to them. The consequence was that when the house was finished, and the time arrived for laying the sidewalk, it was discovered that the first floor would come below the street, and, moreover, that the sidewalk line would be less than eight feet from the top of the carriage-entrance. Naturally, the proprietor, when he found that he could not drive into his house, refused to pay the architect's bill, and the latter summoned him before the Tribunal of the Seine, which decided that the architect had committed a grave fault, and must suffer the consequences to the amount of two thousand dollars and costs, or a little more than the balance due him on his own bill. It is characteristic of French jurisprudence in such matters that the fact of the architect's having consented to the adoption of a defective position for the carriage entrance, even at the express desire of the owner, so far from excusing his fault, was held rather to have aggravated it.

SAINT AUGUSTINE, Florida, is about to be endowed with remarkable architectural interest by the erection of a Roman, or rather, a Pompeian house, on an immense scale. A small house of the sort was once built by Prince Napoleon in Paris, and King Louis of Bavaria, among his other freaks, constructed one at Aschaffenburg, near Munich, where, under the name of the Pompeianum, it still attracts visitors; but these are small affairs in comparison with the huge house which St. Augustine will possess. Externally, the building is to be quite plain, presenting walls of coquina concrete, colored in the mass, and formed into panels and pilasters. In the middle of the front is a wide door, opening into the vestibulum, and thence into the atrium, a room thirty by forty feet, which forms the reception-room of the mansion. The atrium is open to the sky in the middle, and around it are four cubicula, a bibliotheca and an exedra, or conversation-room; while an ostiarius occupies a small room opening out of the vestibulum, and opens the door to visitors. Beyond the atrium is the peristylium, a room, or rather court, forty feet by fifty-two, open to the sky in the middle, and furnished with a colonnade and a fons. On one side of this court are the pinacotheca and the winter triclinium, both of which are also entered from the atrium, and beyond is the summer triclinium, with which is connected a culina on one side, and on the other a lararium, where the proprietor is to keep what purport to be his household gods. The house stands on a corner, and, according to the Roman custom, one side is occupied by tabernæ, which have no communication with the interior of the house, and are, we suppose, to be rented to the sewing-machine agents and grocerymen of St. Augustine. In the second story, which is reached by a separate entrance from a side-street, are a few rooms and a solarium or roof-garden, which will have fountains, trellises, and other suitable ornaments. The furniture is to be copied from objects in the British Museum and the Louvre, the interior is to be decorated by Parisian and other artists in the purest Pompeian style, and casts of a complete set of statues, such as a Romano-Greek gentlemen of the first century A. D. would be likely to have in his house, will be set up in appropriate positions. The architect is Mr. G. Hornblower, A. R. I. B. A., who, with the consent of the owner, Mr. Franklin W. Smith, of Boston, furnishes the *Builder* with a plan, description, and two fine perspective drawings.

EQUESTRIAN MONUMENTS.[1]—XIII.

AS ADJUNCTS OF ARCHITECTURE.

THE original statue of Louis XII at Blois—the work of Guido Mazzoni, a sculptor of Modena brought from Italy by Charles VIII—bore under it the inscription:

HIC UBI NATUS ERAT DEXTRO LUDOVICUS OLYMPO
SUMPSIT HONORATA REGIA SCEPTRA MANU
FELIX QUAE TANTI FULSIT LUX NUNCIA REGIS
GALLIA NON ALIO PRINCIPE DIGNA FUIT.
Fraustus, 1498.

This statue was destroyed in 1793 and was not replaced until in 1845 the government undertook the restoration of the château. The present one is the work of the sculptor Seurre, who based it upon a drawing preserved in the Cabinet des Estampes of the National Library.

A similar statue, probably of Francis I, may have once had a place in the large central opening of the façade of the Château de Gaillon, but the only reason for thinking so is a lithograph by Müller, an artist who was somewhat given to embellishing the subjects he depicted. No mention of such a statue can be found in the printed descriptions of the château, nor any other illustration. Whether or no Müller had any authority for introducing this statue the conception, as shown, is both good and unusual, in that it represents the king boldly riding out from the archway, and not aimlessly ambling along the face of the wall.

Portal of the Chateau de Gaillon.

The photograph of the north porch of St. Maria Maggiore, at Bergamo, is familiar enough, but the amusement excited by the whelp-surrounded lions upon whose backs are placed the pillars of the porch, distract attention from the equestrian statue in the upper part which shows a certain St. Alexander, or, as the figure is often called, Duke Lupus who, also, is shown as riding out from under the canopy. This piece of sculpture is inscribed: "*Filius Ughi di Campiliane fecit hoc opus*, 1353." This porch, which was removed to its present position from the Church of San Alessandro in the lower town, gave Street so much pleasure that, in his "*Brick and Marble Architecture*," he speaks of it thus: "Such a porch as this northern porch at Bergamo is, indeed, a great treat to an ecclesiologist, teeming as it does with ideas so fresh and new; and, in a small compass, giving so much of the radical points of difference between northern and southern Gothic, and, at the same time, offering so beautiful a study of constructional coloring, that it is impossible to tire of gazing at it."

So far as research can discover, there is not a single instance of the employment in modern times of an equestrian statue as an adjunct of architecture in the way that was adopted with so much success at Blois. The statue of Louis XII there seems as much a part of the architecture, as integral a part of the architect's original conception, as the open staircase itself. While the embrasure over the entrance remained empty pending the restoration of the château, the observer could not but have felt that the central point of interest of the façade was lacking. Having become habituated to this feature of one of the most elegant pieces of modern architecture, it is doubtful whether a similar employment of equestrian sculpture in connection with another style of architecture would be unquestioningly accepted by the student of art. The figures are sculpturesque, and the action of the horse is gentle enough not to interfere with the architectural quietude of the man.

St. George, Vienna. Donkorn, Sculptor.

A less successful employment of the Louis XII motive may be found at Nancy—less successful because less architectural in its treatment, and yet not altogether unsuccessful, since the more vivacious action of the horse, which is bestridden by Antoine, Duke of Lorraine, together with the uplifted sword of the rider, bring the composition fairly into harmony with the exuberant flamboyancy of the architectural detail of the central motive of the old Ducal Palace, now converted into the museum of antiquities of Lorraine. Like most of the sculpture now extant on French buildings of an early date, this group, by the sculptor Viard-Horné, is but a restoration—though probably not a replica—of an earlier group by Mansuy Gauvain, a sculptor of the early sixteenth century, which had been destroyed by the revolutionary iconoclasts in 1792. The building itself was begun by Duke Raoul, who ruled about 1329, and was finished by René II, while Antoine and Charles III enlarged and embellished it. The central motive, the doorway, was due to Antoine, who finished it in 1512, and it was his figure that was placed there. The building was not restored after the Revolution until 1848, and the present statue was put in place in 1851 where, though all the rest of the building was destroyed by fire in 1871, it still remains.

A less familiar statue of similar character is to be found at the Château de Verger, in Anjou, where Pierre de Rohan rides beneath a projecting canopy. This canopy and the withdrawn curtains held back by little winged genii, stamp this figure as less in place on the outside of a building than the Louis XII and Duke Antoine of Lorraine, and suggest the work of an Italian sculptor, who still retained memories of the treatment of equestrian figures on some of the celebrated mural tombs of Italy.

While at Nancy, since it may not be visited again, it is well to mention another equestrian statute, a miniature figure of Duke René II (1473–1508), the conqueror of Charles the Bold, which is a reproduction of the leaden original by Lépy, which is now in the Museum. This little statue surmounts a fountain which stands in front of the new Church of St. Epore, built, in 1863–75, on the site of an earlier church dating from 1451. The tower and spire here shown are 285 feet high. Besides this little figure which is not exactly in place in this consideration of equestrian sculpture and architecture, there is in the Museum of the Hôtel de Ville a bronze

[1] Continued from No. 650, page 42.

equestrian statue of Duke Charles III, by the sculptor Chaligny, a native of the city; and there is also a statue of the same personage — which may or may not be equestrian — over the doorway of the

Monument to Adam Mickiewicz, Cracow, Poland. (Godebski, Sculptor.)

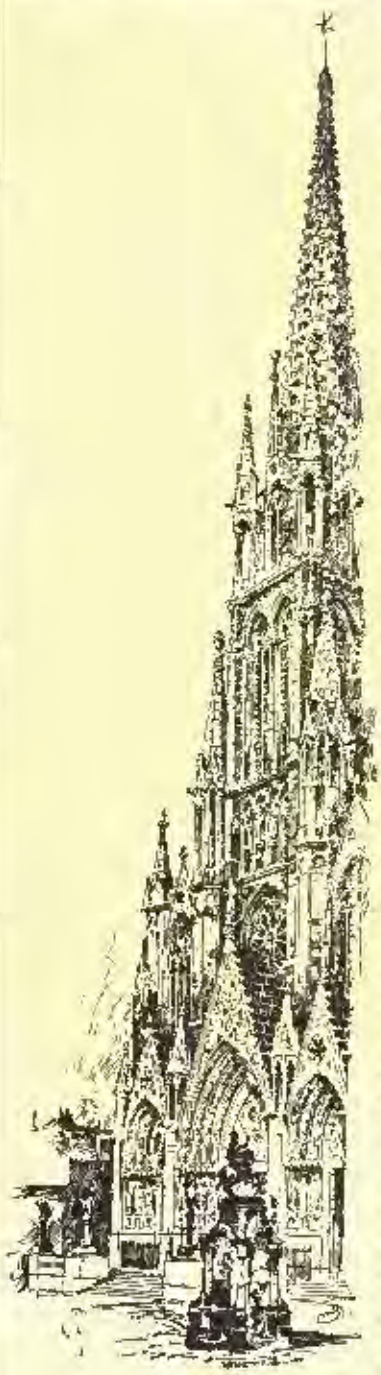
Church of Nôtre Dame: it is probably equestrian, however, since it is said to have been taken as a model for the equestrian figure of Louis XIII, at Dijon. More closely connected with this branch of

Doorway of the Convent of St. Francis of Assisi, Palma, Balearic Islands.[2]

the subject, is the equestrian figure of St. George and the dragon which surmounts the Porte St. Georges, at Nancy, a work of the native sculptor, Florent Drouin, which Duke Charles III caused to be erected there.

There is a minor instance of a treatment somewhat similar to the Blois motive to be found at Vienna in the fountain of St. George, which decorates the palace of Prince Montenuovo, now the Anglo-Austrian Bank: here the group, a St. George and the dragon by Fernkorn, gets its framing in a shallow niche in the face of the wall of the first story, but the sculpture can not in any sense be considered as a part of the architecture.

The only bit of modern equestrian sculpture that can reasonably be brought into the same category with these figures was the alto relievo by Mercié over the *guichet* of the Louvre, which has already been illustrated, and which the bas-relief, evidently inspired by it, on the new monument erected at Cracow, to Adam Mickiewicz, by Godebski, sculptor, may serve to recall. The figures on Strasbourg Cathedral seem to be entirely accidental, and not parts proper of the architectural design. Wherever else equestrian sculpture is united with the architecture of the building, it is usually in the form of bas-reliefs in such a way as to lie in a sort of neutral ground between decorated construction and constructed decoration, while yet always coming within the province of the architect to control or direct, or else it exists as decoration pure and simple, and the connection of the architect with it has been only to provide the proper pedestals for the detached groups.



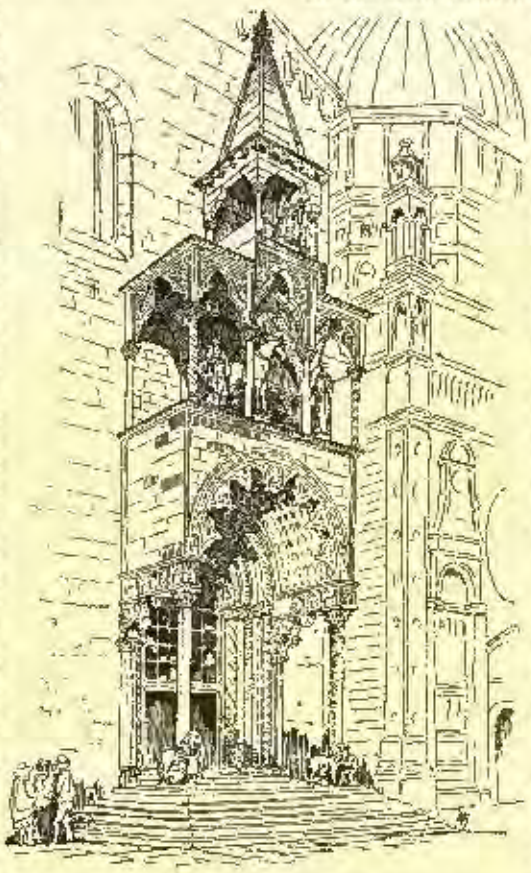
Duke René II., Nancy, France.

It is strange that modern architects should have neglected such a possibility of leading interest to their buildings, although it is not a very obvious means. An equestrian statue with its pedestal is usually in the way in a city, and has either to be set up in a special enclosure of its own stolen from the lawful claim of traffic's needs, or is sent off to find a place in some large park, where few can see it, and where, generally, its sculpturesque and architectural lines are not in keeping with sylvan surroundings. But if such sculpture should be designed for a place on some important building, where it would be out of the way of traffic, and fitly form the central point of some short vista, it could effect a gain in many ways. It could be erected more economically than a statue standing free on a pedestal of its own, for, practically, only two-thirds of the figure need be highly finished, since the parts next the back of the niche could be left in the rough, and what would correspond to the work required for the pedestal could be restricted to that which would be needed to finish but a single side of the same. Or, to put the same idea in another form, for the money needed to erect a good statue standing free, a much more elaborate, more satisfying, and less obstructive result could be achieved by designing the next equestrian statue we have to erect in conjunction with some public or semi-public building about to be erected in a place suitable for the fair exhibition of such sculpture. There are projects now afoot in many cities looking to the erection of equestrian monuments to leaders who fell, on one side or the other, during our civil war, and the Government might do worse things than, after having taken suitable precautions to prevent the supervising architect of the moment turning the matter into a farce, to offer a wall of the next public building to be erected in such city as a background for such a group of statuary. Perhaps the influence

[1] From *La Semaine des Architectes.*
[2] From the *Moniteur des Architectes.*

and advice of an able sculptor who had a stake in the matter might do more to effect a reform in Government architecture than all the expostulations that the public and the architectural profession can formulate.

In spite of the short time since it was in evidence and the great number of photographs of the Louvre that must have been taken while it was still in place, it has not been possible to procure any illustration of the "Gingerbread Man" which caused its unfortunate author, the famous Barye, so much mortification. Here was a case where an unfortunate sculptor — not a then well-known one, to be sure — was wantonly sacrificed to the supposed exigencies of the architectural surroundings. When it was decided to place a bas-relief of Napoleon III over the *guichet* of the Louvre, Barye, to whom the task was assigned, desired to make the figure in high relief, but the architect, probably M. Lefuel, would not listen to his entreaties, but declared that he could not have the delicate lines of his mouldings and surface enrichment interfered with by a treatment so robust as that which the sculptor desired to adopt. As was, of course, strictly proper, the sculptor had to yield, and the figure was modelled in the flattest of relief and reproduced by the galvanoplastic process by Christophle, with such poor success that it was necessary to plug up many holes and imperfections with lead and wax, which gave to the sculpture the mottled appearance which earned for it the nickname "*le bonhomme de pain d'épice.*" But it filled a void, and though laughed at by all, held its place till the fall of the Empire, when it was one of the things that first fell a victim to the iconoclastic rage that, in France, follows political change. Strangely though, it met a kinder fate than some more deserving efforts: thanks to its flatness it was an easy task to conceal it behind a layer of tinted plaster, which served the purpose of the moment and allowed popular rage time to cool, and made it possible at a later day to remove the *plaque* uninjured, and store it away with other displaced royalties and royal belongings in the Governmental bric-à-brac shop, the Garde Meuble.



NORTH PORCH, STA. MARIA MAGGIORE, BERGAMO
AFTER "BRICK AND MARBLE."

Pierre de Rohan, Maréchal de Gié.[1]

In this connection may be mentioned two bits of equestrian sculpture of, to us, unknown originals by unknown authors, which hold positions in respect to architecture similar to one another: supported on a label over the door of the Loggia dei Mercanti — or Exchange — at Ancona, in Italy, stands a little equestrian figure, of animated action, in high relief, while over the doorway of the Convent of St. Francis of Assisi, at Palma, a city on one of the Balearic Isles, is a fragment of a similar equestrian figure.

As one more instance of the many places and ways in which the horse was wrought into ecclesiastical sculpture, may be mentioned the relief of St. Martin, as usual dividing his cloak with a beggarman, on the façade of St. Martin, at Laon, France, the church dating from 1150. The church of St. Croix at Bordeaux, published in the *American Architect*, for December 6, 1884, also contains in a large niche in the façade a group of St. George and the dragon in high relief.

As a type of the horse used as an adjunct, of what may be styled marine sculpture, the famous fountain of Apollo in the Park, at Versailles, may be mentioned.

A very admirable type of the many uses of the horse in connection with pedimental sculpture, or as crowning feature of a triumphal arch, or as support of some piece of heraldic sculpture, may be cited in the group which has a place over the entrance to the Imperial Library, at Vienna, whence it looks down upon the equestrian figure of Joseph II, in the Josefplatz below.

Charles-Emile-Marie Seurre. — Born at Paris, 1798. Died there 1868. Pupil of Cartellier. Won the prize of Rome in 1824. His works comprise a statue of "Leda"; the statue of Napoleon I, formerly on the Vendôme column; a statue of Charles VII; one of Rollean; and the figure emblematic of poetry on the tomb of his friend Casimir Delavigne, in the cemetery of Père Lachaise.

Francis I. — Born at Cognac, 1494. Succeeded Louis XII, 1515; conquered the Milanese the same year; was a candidate for the imperial crown, which Charles V obtained, and formed a league with England and the Pope against Francis, who was defeated at Pavia, 1525, and taken prisoner; confined in Madrid until 1526, when he continued the war until 1529, and later until 1544; promoted science, art and literature; died March, 1547.

Chateau de Gaillon. — This magnificent castle, erected at the beginning of the sixteenth century, was built by Cardinal Georges d'Amboise, minister of Louis XII, as a *maison de plaisance* for the archbishops of Rouen, from designs by Androuet du Cerceau, the famous architect. It was enriched with sculptures by Jean Juste of Tours. It was mostly demolished at the Revolution and is now used as a house of detention, having been rebuilt, though greatly altered. A part of the old façade was preserved and has been erected in the court-yard of Ecole des Beaux-Arts in Paris. The fine marble relief of St. George and the Dragon which is now in the Salle du Michel Colombe at the Louvre, was brought from Gaillon. This château was a favorite residence of Francis I.

Pierre de Rohan. — Pierre, Vicomte de Rohan, Maréchal de Gié, was born in Brittany about 1440. He was made Marshal in 1475 and enjoyed the favor and confidence of Louis XI and Charles VIII, the latter of whom he accompanied in his Italian expedition. He was appointed by Louis XII preceptor to the young prince, afterwards Francis I, but subsequently fell into disgrace and was deprived of his dignities. Died 1513.

Viard-Jouenne. — Born at Saint-Clément (Meurthe). Pupil of Rouniaseaux. The museum at Nancy possesses by him a bust of the chemist Braconnot, and statues of "Christ bound to the column" and "St. Sebastian."

Antoine, Duke of Lorraine. — Born at Bar-le-Duc in 1489. Son of René II. Succeeded his father in 1508. Maintained a neutrality in the war between Charles V and Francis I and reigned mostly in peace. Died in 1544.

Mansuy Gauvain. — A sculptor who flourished at the beginning of the sixteenth century.

Chaligny. — There were two sculptors of this name, David and Antoine, apparently brothers, and this statue is sometimes said to be their joint work.

Florent Drouin. — A sculptor, of Nancy, who lived in the sixteenth century.

Charles III, Duke of Lorraine ("The Great"). — Born at Nancy in 1543. He was the son of Francis I, Duke of Lorraine, who died in 1545. Married Claude, daughter of Henry II of France, in 1559. Died 1608.

Nicolas Lepy. — Born at Nancy, 1788. Died 1809. Pupil of his father. He executed medallions in ivory of the Emperor Alexander and the archduke Charles. In the museum at Nancy is a bust of Leopold I, Duke of Lorraine, in plaster, which Lepy executed in marble for the monument to that prince in the Church of the Cordeliers.

Duke René II of Lorraine. — Born in 1451. Became duke in 1473. His dominions being invaded by Charles the Bold of Burgundy, René, with his Swiss allies, defeated Charles at Murat, 1476. The next year he gained another famous victory near Nancy, where Charles was killed in battle. René formed an alliance with Venice and in 1480 was appointed captain-general of that republic; but on the death of Louis XI of France left the service of Venice. He died in 1508.

The Loggia dei Mercanti, Ancona. — This building, was designed by Pellegrino Tibaldi, who lived from 1527 to about 1592.

[To be continued.]

The Strasburg Cathedral. — Since the war the cathedral at Strasburg which suffered considerably from the bombardment of 1870, has undergone extensive repairs. In answer to many suggestions on the subject the building was subjected to a very close examination at the end of last year, the result of which has been extremely alarming. It was proved beyond doubt that many portions were threatened with complete ruin and that no time was to be lost. A report to this effect will be submitted to the municipal council. — *N. Y. Commercial Advertiser.*

[1] From La Croix's "*Louis XII et Anne de Bretagne.*"

SUGAR IN MORTAR.

ALTHOUGH saccharine matter has been employed in India as an ingredient of mortar from time immemorial, and reference has been made to it by standard authorities, which has attracted considerable attention in England and America during the past two or three years, its effect is not generally known.

Sugar unites with lime, and forms sucrate of lime — a solid which possesses considerable strength, dissolves freely in water, and is acted upon by carbonic acid. All hydraulic cements contain at least 50 per cent of lime compounds; hence, if a saccharine substance be added to mortar, the sugar will unite with the lime and form sucrate of lime. The effect of this compound may be an advantage or a disadvantage, according to attendant conditions. For example, if the mortar is composed of common lime and sand, the sucrate of lime, being stronger than the carbonate, will add to the strength of the mortar; and as the lime will unite with the sugar more rapidly than with the carbonic acid of the air, the sugar will also cause the mortar to set more quickly.

In India, the practice is to add one pound of the coarsest sugar (or its equivalent in syrup) to each gallon of water with which the mortar is mixed. "This amount of sugar adds one-half to the breaking strength of the mortar and doubles its cohesive strength." It is better to dissolve the sugar in the water than to mix it dry with the lime, since some limes in slaking "burn" the sugar, thereby destroying its strengthening effect, and also blackening the mortar.

The addition of sugar increases the early strength of lime mortar, since the sucrate of lime develops its strength more rapidly than the carbonate. If lime mortar were used in the interior of thick walls, the addition of a saccharine substance would be beneficial, since lime mortar thus placed would never become fully saturated with carbonic acid.[1] The addition of sugar to cement mortar will accelerate or retard the setting of the cement, depending upon: (1) the amount of sugar present (so far as the cement is concerned the sugar is an adulteration); (2) the relative indurating activity of the sucrate and the silicate, and (3) the amount of water used (the cement is hydraulic, while the sucrate is non-hydraulic, and hence the former will set in the presence of water, while the latter will not). This principle may explain the conflicting results obtained from different experiments. For example, one experimenter[2] found that sugar greatly accelerates the setting of Portland cement, causing it to set in a few minutes; on the other hand, most experimenters[3] find that sugar in any proportions retards the setting of Portland cement. All experimenters agree that sugar retards the setting of Rosendale cement.

Sugar added to mortar may increase or decrease the ultimate strength of the mortar, depending upon: (1) the amount of sugar present, and (2) the relative ultimate strength of the compounds formed. For example, with lime mortar, the maximum effect — an addition of 50 per cent to the ultimate tensile strength — is obtained when the weight of the sugar is equal to about 10 per cent of the weight of the lime. With neat Rosendale cement mortar, the maximum effect at the end of three months — an addition of about 20 per cent to the tensile strength — is obtained with ⅛ to ¼ per cent of sugar. With neat Portland cement mortar the evidence is conflicting. One experimenter[4] obtained a maximum effect — an addition of 25 per cent to the strength — with one per cent of sugar; while another[5] concluded that "sugar was of no great advantage in combination with the best qualities of Portland cement." The last was corroborated by experiments made by the author.

The sucrate of lime, being soluble in the water, will in time be washed out by the rain; therefore the addition of a saccharine substance to mortar is most beneficial in a dry climate, as in India, for example. A saccharine substance should not be added when the cement is to be used under water. The compounds of lime with sugar are attacked by the carbonic acid of the air, and hence the strengthening effect of the sugar is not permanent when the mortar is exposed to the weather. Owing to these two facts, the use of sugar with cement is not of much practical value. Although sugar adds materially to the strength of lime mortar, the compound is inferior in strength and durability to cement mortar, and costs proportionally more.

It is highly probable that the effects obtained by mixing sugar with mortar can also be obtained by the use of gum-arabic, dextrine, glucose, etc. The use of such materials involves some interesting questions; and a study of this subject by a mason-chemist might lead to valuable results.

IRA O. BAKER, C. E.

[1] Lime mortar has been taken from the walls of ancient buildings which were only 50 to 80 per cent saturated with carbonic acid after an exposure of nearly 2,000 years.

[2] *Engineering News*, Vol. XVII, page 6.

[3] For example, *Mechanics*, Vol. IX, pages 315-317; a paper read at the Washington meeting of the American Society of M. E., to be published in Vol. IX of the *Transactions* of that Society.

[4] *Mechanics*, Vol. IX, pages 315-317; a paper read at the Washington meeting of the American Society of M. E., to be published in Vol. IX, of the *Transactions* of that Society.

[5] *Engineering News*, Vol. XVI, page 338.

THE ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE ATLANTIC BUILDING, WASHINGTON, D. C. MR. JAMES G. HILL, ARCHITECT, WASHINGTON, D. C.

[Gelatine Print, issued only with the Imperial Edition.]

THE Atlantic Building has a frontage of but 41 feet and a height of 106 feet from sidewalk to top of parapet coping. The lower story supports are of iron. Red Potomac sandstone in second and third stories and brick and terra-cotta, with a few stone bands, above.

The Josefplatz, Vienna, Austria.

CHURCH OF ST. MARTIN, LAON, FRANCE.

This plate is reproduced from Ramée's "*Le Moyen Age Monumentale et Archéologique*" in connection with the article on "Equestrian Monuments."

STATUE OF LOUIS XII ON THE CHATEAU DE BLOIS, FRANCE.

SEE article on "Equestrian Monuments," elsewhere in this issue.

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DUKE ANTOINE OF LORRAINE, NATIONAL MUSEUM, NANCY, FRANCE.

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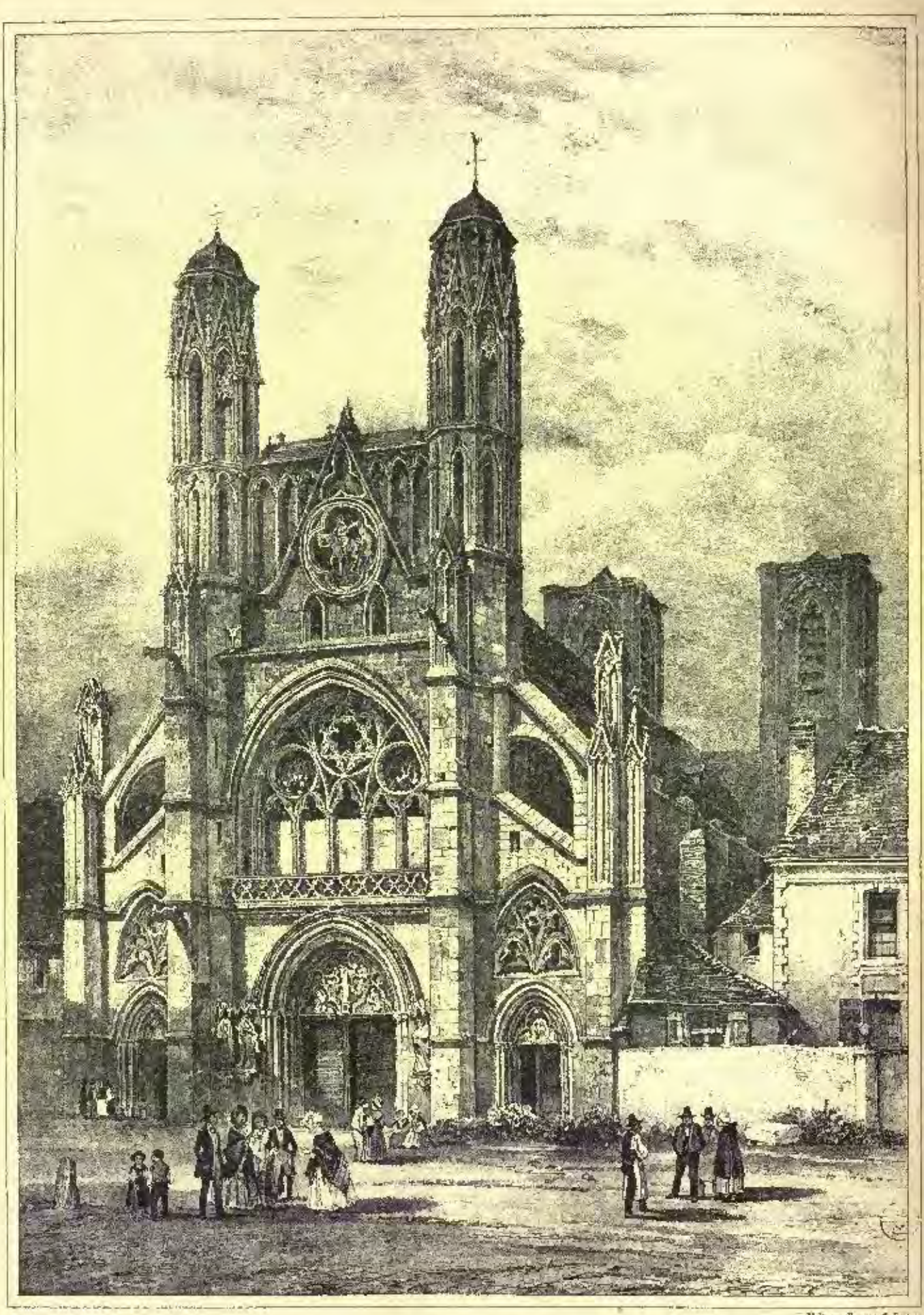

Dessiné par Benoist

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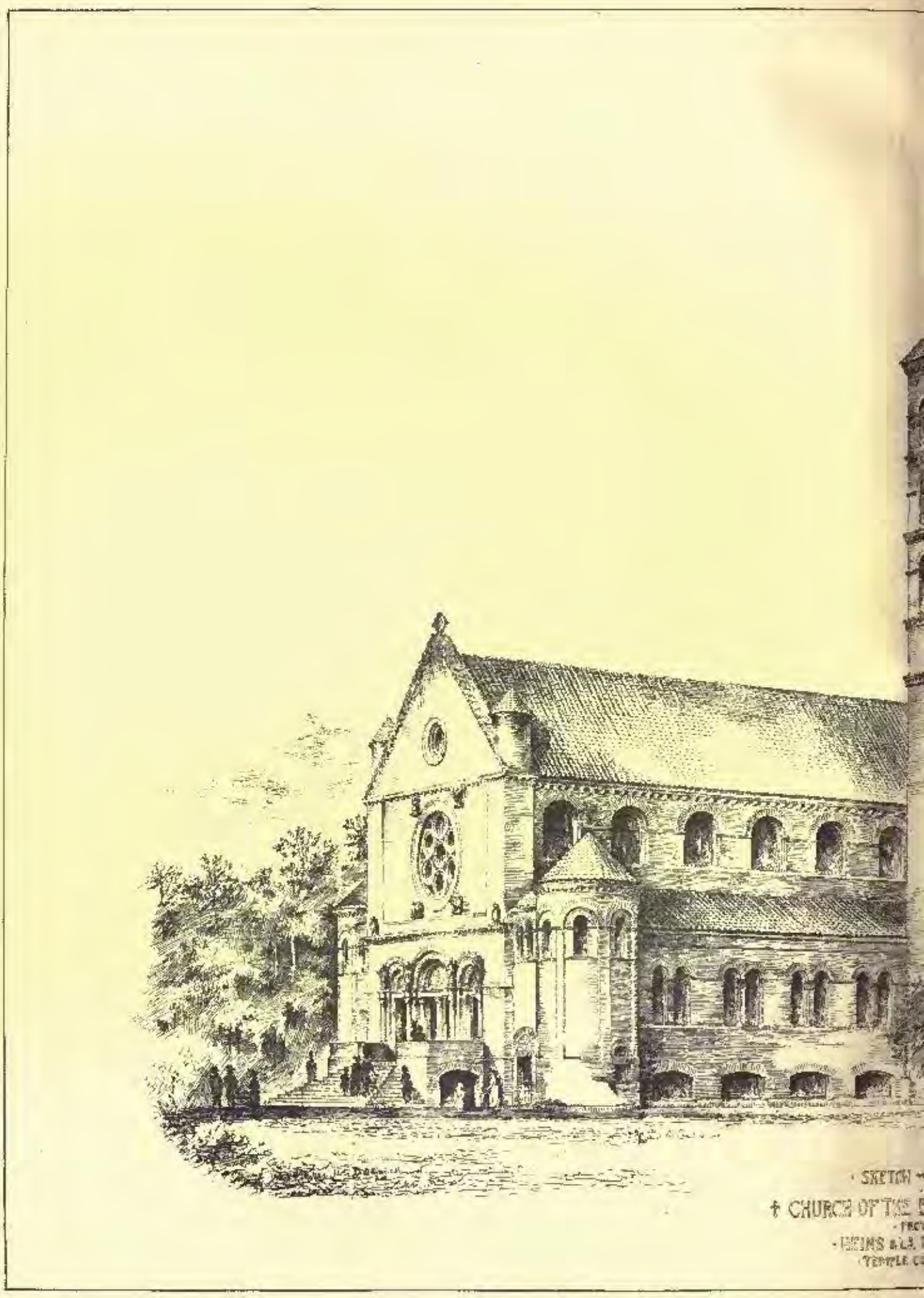
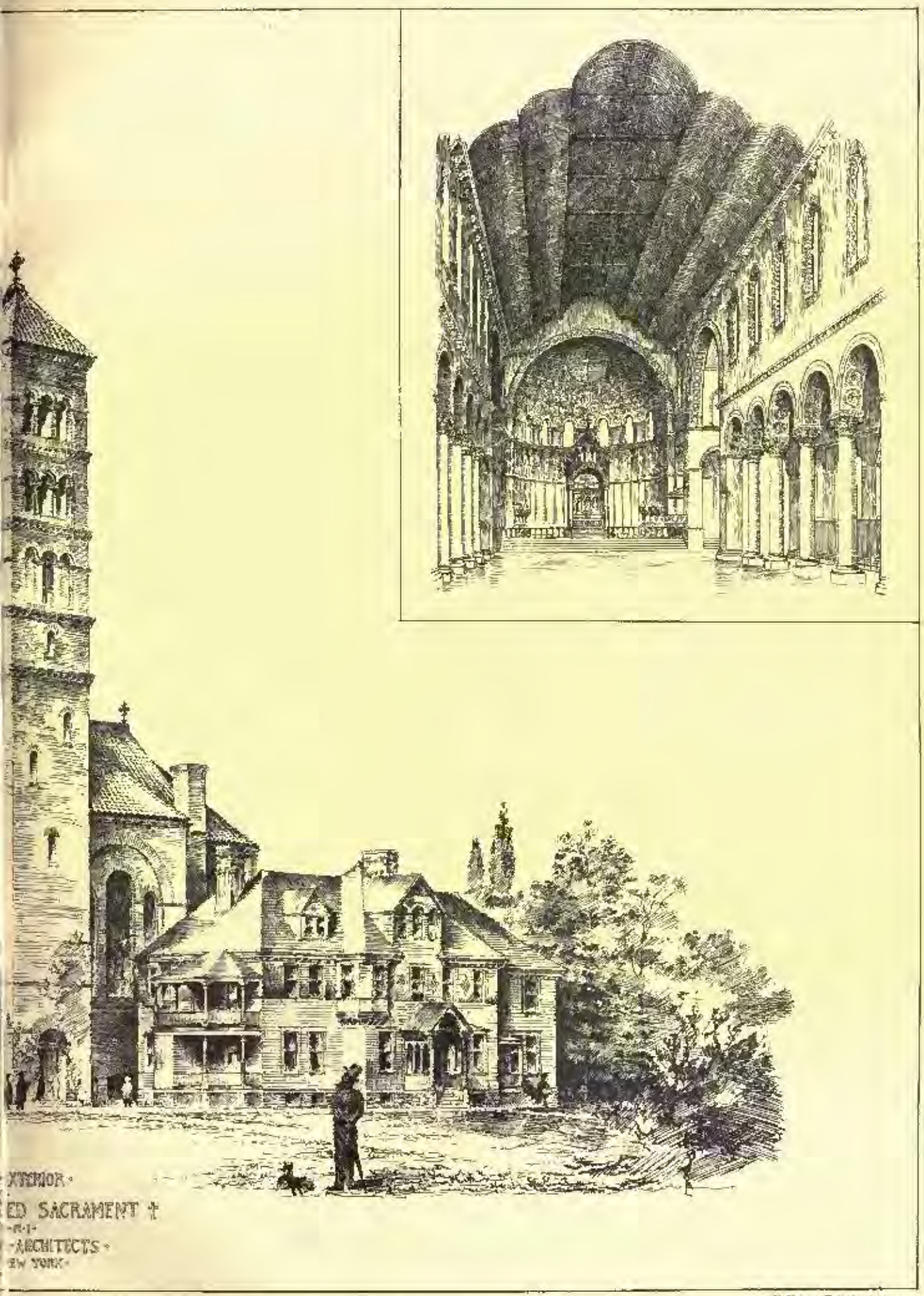
Portail occidental de l'Eglise St. Martin

à Tours


SKETCH
CHURCH OF THE
HEINS & LA
TEMPLE



XTERIOR.
ED SACRAMENT †
-R.I.
-ARCHITECTS-
EW YORK-

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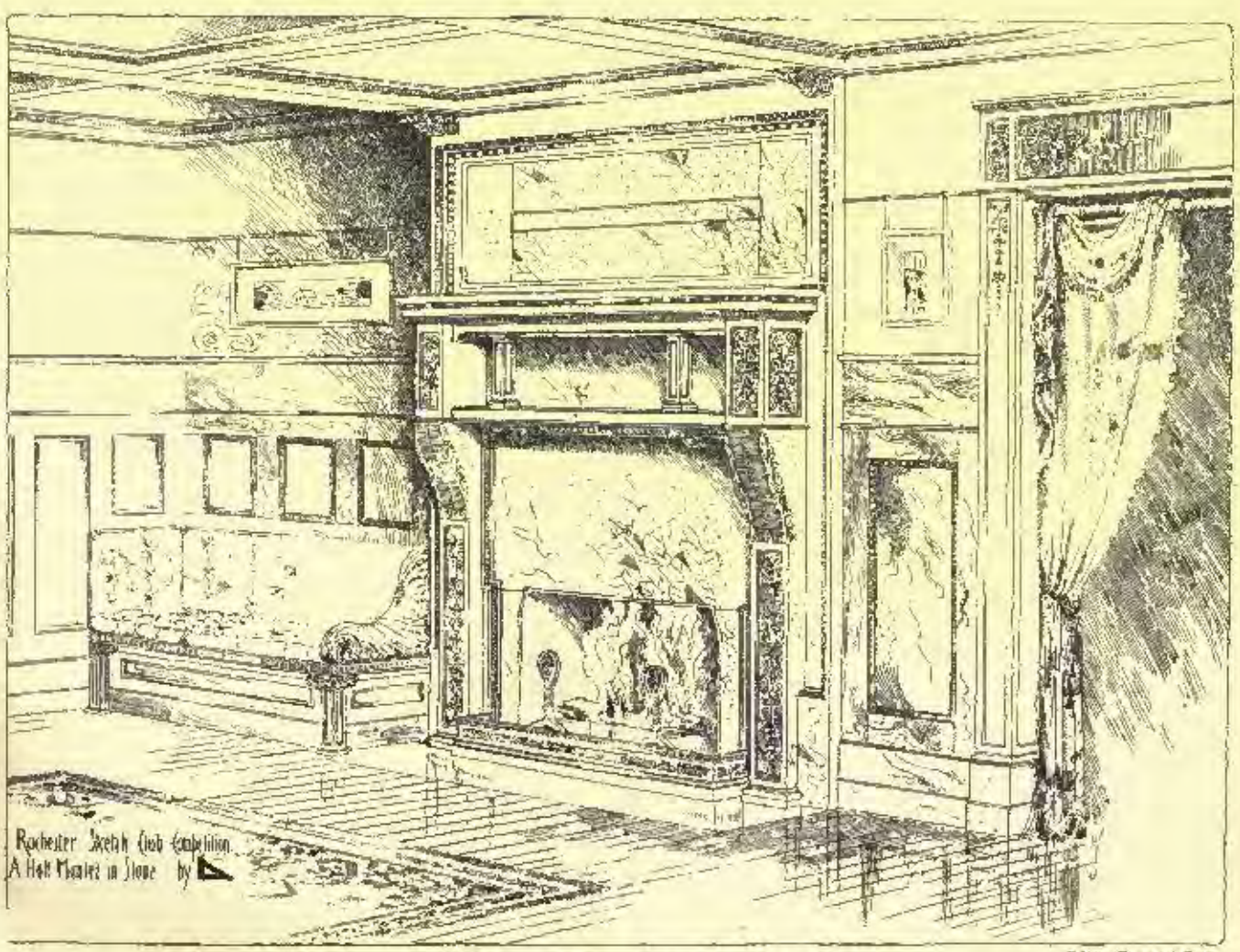
SECOND PRIZE — CLAUDE F. BRAGDON.



FIRST PRIZE — WM. N. ORCHARD.

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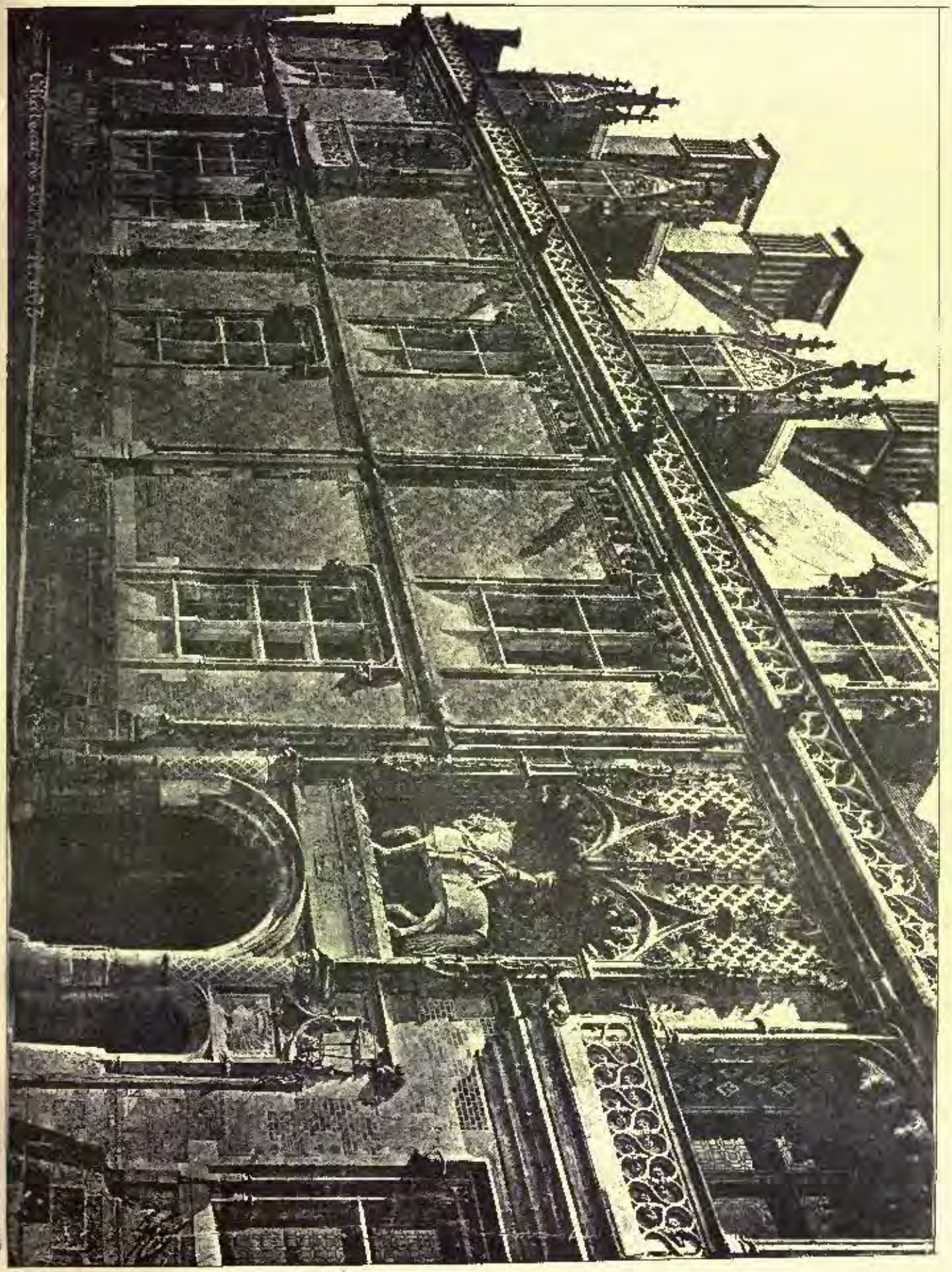

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THE ATLANTIC BUILDING, WASHINGTON, D. C.

JAMES G. HILL, Architect.

STATUE OF DUKE ANTOINE OF LORRAINE, AT NANCY.

See article on "Equestrian Monuments."

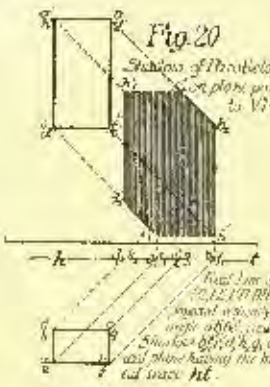
SKETCH FOR THE CHURCH OF THE BLESSED SACRAMENT, PROVIDENCE, R. I. MESSRS. HEINS & LA FARGE, ARCHITECTS, NEW YORK, N. Y.

DESIGNS FOR FIREPLACES BY MESSRS. W. H. ORCHARD AND C. F. BRAGDON: MEMBERS OF THE ROCHESTER SKETCH CLUB.

ARCHITECTURAL SHADES AND SHADOWS.[1]—III.

THE GENERAL METHOD.

Drawing shadows when the line of shade is known, and surface of incidence is a plane parallel to a plane of projection; difficulty in other cases; "slicing" explained; slicing the cone; finding points of the line of shade and of its shadow; shadow of a cone on a cone; recapitulation; note on surfaces of revolution.



29. In order to draw the projections of the shadow of an object, we must ascertain the projections of its line of shade. By drawing through a sufficient number of points of this line the projections of rays of light, and finding the intersections of the latter with the surface of incidence, we obtain the projections of points in the line of shadow which is then drawn through these points with an accuracy depending upon their number. When the surface of incidence is a plane parallel to the plane of projection, and the line of shade is that of a simple geometrical solid (as in a large part of the cases the draughtsman has to deal with), the problem is much simplified. Thus in Figure 20 we have a parallelopipedon whose projections coincide with those of its line of shade (20). Through the extremities of the edges forming this line of shade we draw the projections of rays of light. These intersect the plane of incidence (here supposed parallel to $V'P$) in six points, whose horizontal projections are, of course, on the horizontal trace of the plane of incidence, and their vertical projections directly above, upon the vertical projections of the corresponding rays. The lines connecting these points of shadow thus found form the required shadow of the line of shade, that is, of the object (19 and Maxim X), and the problem is solved.

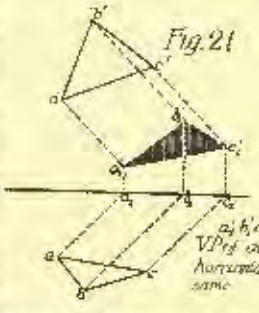
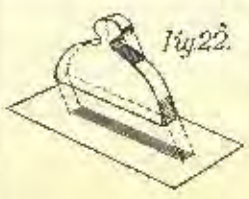
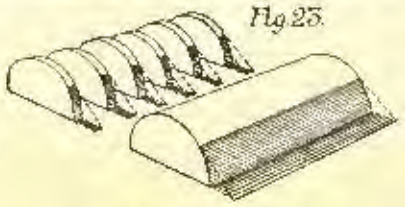


Figure 21 illustrates the application of this process to a plane figure not parallel to either plane of projection, but casting its shadow on one of these planes. Here the line of shade is evidently the "edge" or outline of the figure itself, as shown in 21. In the same way may be found the shadows of a large number of plane figures and of simple geometrical solids when their shadows are cast upon a plane parallel to a plane of projection. Examples of this kind will be shown in Plate II.

30. But when the line of shade is not given, and the surface of incidence is not parallel to HP or VP, or is not a plane at all, the problem requires some more comprehensive method for its solution, and this is furnished by the general method, sometimes called the "Method of Slicing." This is based upon the principle that when a plane figure is parallel to the direction of the light, or, in other words, has one of the elements of its plane parallel to the luminous rays, the figure becomes its own line of shade (21, *b*), its shadow in space a plane, and its cast shadow upon a plane a straight line. The points where rays of light are tangent to its edge, called *points of tangency*, cast shadows which limit its own cast shadow, and of which a part may fall on its own edge, as in *D*, Figure 16, and in Figure 22. Now, by cutting any object and the adjacent surfaces into slices by planes parallel to the rays of light, we obtain a number of such figures. The points of shade and shadow on their edges are points in the lines of shade and of shadow of the object. By drawing the projections of the rays tangent to the outlines of these slices we obtain the projections of points in the required lines of shade and of shadow, which we then draw through these points with an accuracy depending on their number. This operation is illustrated in Figure 23.

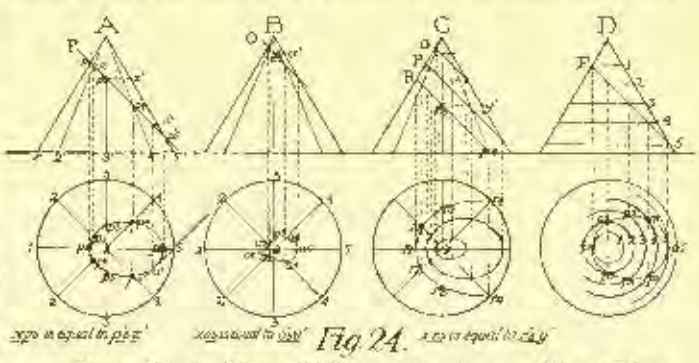
31. The slices may be cut by any series of planes parallel to the rays of light, *i. e.*, containing one element parallel to them. But it is convenient to have these slices perpendicular to one of the planes of projection, as they are then projected upon that plane as right lines. If the solid is a geometrical figure, the other projection of





each slice may be found by assuming points upon its rectilinear projection, and finding their positions upon the surface of the figure in the other projection, these being easily deduced from the geometrical properties of the surface in question.

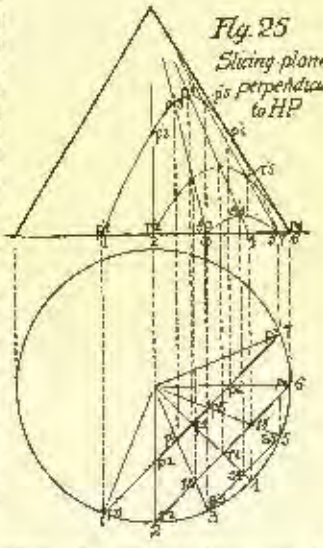
32. Figure 24 shows this process applied to the cone. In *A* the cone is cut by a plane normal to VP, and five points are taken upon the vertical projection of the resulting slice (Chap. II, note 9, *b*). Through these the vertical projections of five elements of the cone



are first drawn, and then their horizontal projections, upon which the horizontal projections of the five points are easily found, together with three more similarly situated upon the further side of the cone. These eight points determine quite accurately the outline of the "slice" in horizontal projection, and greater accuracy may be secured simply by multiplying the points assumed in the first instance. This outline is, of course, an ellipse, and upon it the horizontal projections of two points of the line of shade may be determined, as above, by means of tangent rays. Their vertical projections are easily found on the vertical projection of the slice.

In *B* the same process is repeated higher up on the cone, and in *C* a section is taken lower down, the other two being repeated. The process may be continued as long as new points in the line of shade are required.

It will be observed that some auxiliary means is necessary for finding the horizontal projections of points on the middle elements, numbered 3 in the figure. This is furnished by the radii $p'3'$, $o'3'$, and $r'3'$, taken at the respective levels of the points situated on these elements, and which show the distance of these points from the axis of the cone. Indeed, the other points might all have been got in horizontal projection by means of radii taken at their various levels, as these points would lie upon the horizontal projections of circles described by these radii (Figure 24, *D*).



In Figure 25 the secant planes are normal to HP; the horizontal projections of the slices are rectilinear, and their vertical projections hyperbolas. Drawing rays tangent to these hyperbolas in vertical projection we may obtain points in the vertical projection of the line of shade, and their horizontal projection can be easily found on the plan below.

32. The form of the cast-shadow of a plane figure or slice parallel to the light, is determined by the intersection of its invisible shadow (which is, of course, a plane coinciding with that of the figure itself, [21, *b*]) by the surface of incidence, and is projected as a straight line when the figure itself is normal to the plane of projection. If the surface of incidence is a geometrical figure or a plane, the other projection of the line of shadow is easily found in the same manner as was that of the line of shade, by consideration of the geometrical properties of the surface in question. Both lines,

[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 127, No. 660.

indeed, are the intersections by one and the same plane of two surfaces, that of the object, and the surface of incidence; and when the secant plane is normal to the plane of projection, the corresponding projections of these two intersections, that is, of the lines of shade and of shadow, lie in the same straight line. Thus, in Figure 26, $p'1\ p'2$, is the shadow cast upon cone b' by one slice of cone a'. By means of a number of such slices we could determine the whole shadow of a' upon b'.

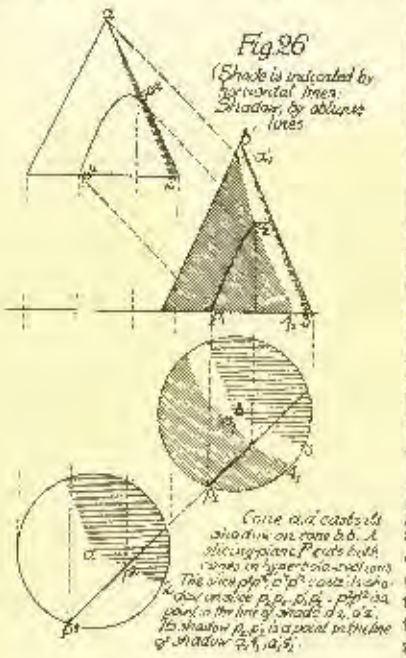


Fig. 26
(Shade is indicated by horizontal lines. Shadow, by oblique lines)
Cone a' casts its shadow on cone b'. A slicing plane P cuts both cones in hyperbolic sections. The line $p'1\ p'2$ casts its shadow on the cone b', and is a point in the line of shade $c'2$, c'. Its shadow $p_1 p_2$ is a point in the line of shadow $c_1 d_1 c_2 d_2$.

33. This general method may, then, be summed up as consisting of the following operations:

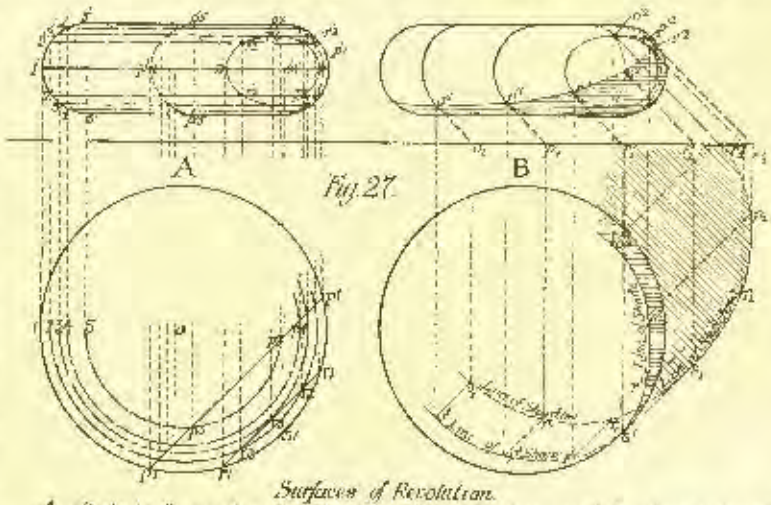
1. Assume any convenient number of secant planes parallel to the light, and normal to one of the planes of projection. The section of the object made by each plane will have one projection coinciding with the trace of that plane, i. e., it will be a right line inclined at 45° to $G\,L$ (Figure 24, *A*).

2. Assuming points on this right line, their projections on the other plane are found by means of elements of the surface of the solid passing through the given points; the method of drawing these elements in horizontal and vertical projection being determined by a consideration of the geometric properties of the surface. The projection of the slice is then drawn through the points thus found (Figure 24, *A*).

3. To the outline of the slice thus obtained, tangents are drawn parallel to the projection of the direction of light, i. e., at 45° to $G\,L$. The points of tangency are the projections on that plane of points of the line of shade. The other projection of each point is found upon the right-line projection of the corresponding slice (Figure 24, *A*, $a^1\ a'^1$; Figure 26, $p^2,\ p'^2$).[1]

These operations are repeated until a sufficient number of points have been found to determine with reasonable accuracy the line of shade. In many cases the known geometrical properties of the surface enable us to determine the whole line of shade by the aid of but one or two of its points. Thus, in the cone, since the line of shade is a right line, having located a single point by means of one secant plane, the line of shade is drawn through that point and the vertex of the cone (Figure 26, $a2$, $a'2$, drawn through $p2$ and $p'2$).

4. By prolonging the secant planes until they intersect the next adjacent surface, and producing the tangent rays until they intersect the outline of the resulting intersection which is ascertainable when the surface is of a geometrical solid or a plane, points of the line of shadow are obtained, and the line of shadow drawn through them. The problem is thus solved (Figure 26).



Surfaces of Revolution.

A illustrates the operation of finding the outlines of sections made by slicing planes P,P, and S, by means of the horizontal circles 1,2,3,4,5, the intersections of these by FR, being indicated by the small figures affixed to p,r &c. In *B* are shown tangent rays drawn to four section outlines so obtained, giving points of the line of shade (indicated by small figures above the letters) and of the line of shadow (indicated by small figures below the letters).

34. This method may be applied to the case of any object or surface whose geometrical properties enable us to obtain two projections of each slice, one a right line and the other a plane figure; and there are few or no architectural forms which do not fall into this category. It is especially convenient of application to solids of revolution, for which the detailed procedure is explained in the note to this chapter. But there are a great many cases in which this method though applicable, is cumbrous and laborious. For such cases, special processes of more limited scope are handier and more rapid. These short-cut rules generally depend upon an analysis of the properties of particular classes of geometric figures and solids occurring most frequently in architecture, and take the form of a categorical statement of the forms of their lines of shade and of their shadows on planes and other simple geometrical surfaces, with particular instructions for drawing both projections of the forms thus stated. The application of the general method is thus limited to those cases which do not fall under these special rules and conditions.

[1] Hereafter, as in Figures 24 and 29, points of the line of shade will be indicated by letters accompanied by small figures above the line; points of shadow by letters with figures "subscript" or below the line. Letters followed by small figures on the line indicate points in the sliding-sections.

Note. *Surfaces of Revolution.*—When a surface of revolution has the axis normal to one plane of projection, as $H\,P$, for example, it is projected upon that plane as a circle. It is then most convenient to take the slices parallel to the axis and normal to $H\,P$. Any point located on the rectilinear projection of the slice (that is, in this case, its horizontal projection) will be in a circle parallel to $H\,P$, whose radius is the distance of this point from the axis. The other projection or projections of this circle are easily found (as they are right lines, forming those horizontal elements of the vertical projection of the solid whose lengths equal the diameter of the circle just drawn), and upon them (or it) the required projection of the assumed point is at once determined. This is virtually what was done in Figure 24, *B*, with the points on the element figured 3, and again in Figure 24, *D*. In Figure 27, the points r^3, r'^3, r^4, etc., are determined in this way. The symmetry of the figure gives us two points, r^4, equally distant from the centre o, and these give us four points in vertical projection, since it is evident that the circle 2 represents two circles in vertical projection (both marked 2' in Figure 27). A very few points thus suffice to determine quite accurately the outline of the slice in vertical projection. It is frequently convenient to first assume the circles 1, 2, 3, etc., and allow them to determine the points r^2, r^3, r'^3, etc., of intersection with the rectilinear projection of the slice.

Of course, when the axis is perpendicular to $V\,P$, the conditions are reversed as to the projections, and the operation is carried on as above by substituting one set of projections for the other.

The student will find it profitable to practise "slicing" with a number of different solids of revolution—tori, spheres, ellipsoids, etc.

THE BOSTON MUSEUM OF FINE ARTS.

Boston, Mass., March 25, 1889.

THE Trustees of the Museum of Fine Arts find themselves compelled by the needs of that institution to appeal to the public-spirited citizens of Boston for means to carry it on.

Early in 1887 the growth of the collections made an enlargement of the building necessary. A subscription was asked for, and the sum of $200,000 was given by about one hundred persons for this purpose. It was hoped that a part of this amount could be laid aside as a fund to pay the running expenses, but this was found to be impracticable. More room was needed for Japanese collections of the highest value, which generous friends of the Museum offered to place in it. The proper arrangement of the casts of sculpture, and the convenient circulation of the public on both floors of the Museum, required that the building should be carried round the four sides of a central court. This, with the necessary purchase of casts, will absorb the whole of the subscription.

The income of the Museum applicable to its current expenses was, in 1888, $14,183.39; the current expenses were $21,025.19. These will of necessity be increased by the enlargement of the building.

To administer the Museum to the advantage of the public requires an additional income of not less than $15,000 a year. To provide this sum the Trustees ask for fifteen hundred subscriptions of ten dollars a year. Each subscriber will be entitled to a ticket admitting four persons to the Museum on every day in the year on which it is open.

The Museum of Fine Arts receives no aid from the State or the City; it depends wholly upon voluntary contributions. It has been built and filled with precious works of art which give pleasure and instruction to thousands, solely by the liberal gifts of individuals, not many in number. With the exception of about $5,000 a year received from visitors, its annual expenses have been paid in the same way. It rests its claim for help only on the service it renders to the public; and, in appealing to the public for a wider support, the Trustees feel that they may hope for a general and generous response.

Subscriptions may be sent to E. H. Greenleaf, Curator (to whose

order checks may be made payable), at the Museum of Fine Arts. A ticket will be sent to each subscriber upon the receipt of the sum subscribed.

Samuel A. B. Abbott,	Edward W. Hooper,
Frederick L. Ames,	Henry Lee,
Henry J. Bigelow,	W. P. P. Longfellow,
Stanton Blake,	Charles G. Loring,
Martin Brimmer,	Augustus Lowell,
Francis Brooks,	Charles Eliot Norton,
J. Elliot Cabot,	Edward N. Perkins,
John W. Dickinson,	Henry L. Pierce,
Samuel Eliot,	Alexander H. Rice,
Charles W. Eliot,	M. Denman Ross,
William Endicott, Jr.,	William G. Russell,
John L. Gardner,	Edwin P. Seaver,
William Gray,	Nathaniel Thayer,
William W. Greenough,	George W. Wales,
Thomas N. Hart,	Francis A. Walker,

Trustees.

SOCIETIES

ENGINEERS' CLUB OF PHILADELPHIA. — THE PERMEABILITY OF CEMENTS AND MORTARS.

AT the regular meeting March 16, 1889, Prof. L. M. Haupt presented some notes upon the permeability of cements and mortars, with a view of bringing out a discussion of this subject. He quoted from the recent report of the Board of Experts on the Washington Aqueduct Tunnel. That report says:

"If all of the work could and would be faithfully fulfilled in accordance with the later specifications requiring backing by masonry laid in cement mortar, it would make the tunnel reasonably water-tight; yet it would not prevent all leakage absolutely, and it is difficult to foretell how much water would pass through.

"The head of the water in the tunnel varies from about 75 to 175 feet, and the pressure due to this head from 32 to 76 pounds per square inch. This is an internal pressure, tending to burst the tunnel outward — a direction of force which the tunnel lining is not well adapted to resist; and in an inelastic material like brick or cement cracks are liable to be developed on the least yielding — which would be almost inevitable if any weak points were left in the filling. But even if it were all filled it must be remembered that both brick and cement are permeable to water. It is well-known that bricks are pervious under very ordinary pressure, and experiments have demonstrated that even the best cement is permeable to water and will allow it to percolate under pressure. Mr. James B. Francis, consulting engineer of the proprietors of Locks and Canals in the Merrimac River, Lowell, Mass., made some recent experiments on the percolation of water through cement mortar, a record of which was presented to the American Society of Civil Engineers, May 16, 1888. These experiments showed that about 17½ gallons of water per square foot of surface passed through a thickness of nearly 16 inches of cement in twenty-four hours under a pressure of 77 pounds per square inch. A thinner block would, of course, leak more rapidly in inverse proportion to the thickness. If the brick and cement of the tunnel were of the same thickness and leaked at the same rate, considering only half the perimeter of the tunnel, it would amount to 5,000,000 of gallons in twenty-four hours.

"Mr. Stauffer's experiments, made in the Dorchester Bay tunnel, serve to throw light on the leakage through brickwork. He constructed a bulkhead of brick, laid in cement, 4 feet thick, in a tunnel 10 by 10 feet. He found that under a pressure of 72 pounds per square inch the water percolated through at the rate of 120,000 gallons per day, or 1,200 gallons per square foot.

"The experience on the Bostain Main Drainage Works proved that it was not practicable to build brick masonry that was water-tight under a pressure of 64 pounds per square inch.

"At the new Croton Reservoir, New York, water under 36 feet head was found to percolate through 26 inches of brickwork and 4 feet of concrete.

"The board of experts made some experiments to test the permeability of brick and cement mortar to water under pressure.

"Figure 2, plate 8, shows a sketch of the device used in making the tests. A wrought-iron pipe 5 inches in diameter and about 15 inches long is closed at both ends by caps screwed on. The cap at the bottom has in it a rectangular hole slightly smaller than the end of a brick. A heavy India-rubber gasket, with the same sized opening, is placed at the bottom. In the cap on top of the pipe a smaller pipe enters, which leads from the pump. A pressure-gauge is fixed to this pipe so as to indicate the pressure applied. The brick or block of cement to be tested is set upright inside the cylinder, with its end down, the upper cap being removed for that purpose. A good potter's clay is then pressed into the open space around the brick until the clay comes up to the brick. The cap is then placed on and the pump applied.

"A good, fair specimen of brick was selected from a pile at the Champlain Avenue shaft, and under a pressure of water amounting to 80 pounds per square inch for one hour passed 23.4 cubic inches of water. The same brick under trial for a second hour passed 21.3 cubic inches of water. Taking the average of these two experiments, and reducing to the amount of water passed per square inch of exposed area of surface of the brick, it was found to be 2.8 cubic inches. This is equivalent to 1.75 gallons per square foot of surface per hour; or for the whole interior surface of the tunnel, 27,342,000 gallons per day of twenty-four hours.

"For another selected brick, in the first hour under 80 pounds pressure, 46.8 cubic inches of water passed through; and for the same brick in sixteen hours, under only 53.8 pounds pressure per square inch, 344.5 cubic inches passed — equivalent to 1.68 gallons per square foot of surface per hour; or for the interior surface of the tunnel, 26,248,320 gallons per day.

"Blocks of cement mortar were prepared, in the proportion of cement one part and sand two parts — the materials having been obtained from the stock on hand at Champlain Avenue shaft (the same as used in the tunnel). These blocks were allowed to set for twenty-four hours in the air, and were then placed in water, where they remained for five weeks.

"One of these blocks, placed in the testing apparatus, and subjected to a water-pressure of 80 pounds per square inch, passed in a time of two and one-half hours 2,367.8 cubic inches of water — equivalent to 73.3 gallons per square foot of surface per hour — very far beyond the amount of percolation given by brick.

"A second experiment, under 58 pounds pressure per square inch for one and a half hours, gave a percolation of 871.8 cubic inches of water — equivalent to 15.5 gallons per hour per square foot of surface.

"It is to be noticed from the experiments of Mr. Francis that Portland cement mortar having the same proportions of material as in this case did not transmit the water nearly so rapidly. This was owing in a great degree to the cement; but probably partially to the difference in the quality of the sand, as the sand here used was not of the very first quality. The cement bricks presented an appearance of great porosity; and the result was not altogether unexpected.

"It is to be regretted that the time at the disposal of the Board would not allow extensive and conclusive experiments on this subject."

There was some discussion by Mr. Arthur Mariehal and others. Mr. Mariehal said that the imperviousness of cements is a question of the greatest importance; yet it seems that no steps are taken by manufacturers to improve their products in that direction. The *fineness* is one of the most important considerations, and wherever percolation is prejudicial — as is the case in aqueducts subjected to pressure, in dams, and in works exposed to sea water — care should be taken to select a very finely ground cement. The manipulation of the mortar will also affect its imperviousness.

When asked whether it was possible to make cellars water-tight by means of cement, if the level of the water was, for instance, generally a couple of feet above the floor, Mr. Mariehal answered that some years ago he succeeded in rendering perfectly water-tight, by means of cement, some cellars which used to contain about six feet of water. He then described the process of construction, some discussion of which followed, by Mr. Howard Murphy and others.

Howard Murphy, *Secretary and Treasurer.*

THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.

Paper of the evening by Jno. A. Brashear on "Optical Glass." An interesting description of the casting and grinding of the glass, method of purification and annealing, and examination for internal strains of both flint and crown glass. The imperfections of the glass were described as being due to improper annealing, leaving internal strains, which can be detected by polarized light; also to striæ or chords, which are shown by lines running through the glass, which are liable to be formed in both crown and flint glass. These are shown by examining with a lens, which gives a diffused light, and shows them up well in looking toward a bright light beyond. Striæ are caused by non-homogeneity in the glass, from unequal density of the mass, and from mixture of alumina arising principally from the clay of the pots in which the glass is melted. Striæ causes abberations, which are cured, when they exist in *small* areas, by rubbing the surface down at the location where the stria exists, in that way changing the direction of the light so much as to throw it entirely away from the focal plane of the lens system, thus making it harmless. An interesting description was given of the method of cutting out the lenses from a block of glass with emery. This is done in fifteen minutes' time.

The speaker claimed that optical glass could be made in Pittsburgh, and ought to be, that it needed only the skill and patience of trained operators such as have had long experience in France.

BUILDING LAW

PAYMENT FOR UNEXECUTED PLANS.

Question.— Can you refer me to any adjudicated cases touching upon an architect's right to be paid for plans and specifications for buildings

not carried out. I have found it necessary to sue for pay for such services and beg you to send me references at once.

Very truly yours, *Vitruvius.*

In further reply to this question which was answered in the *American Architect* for March 30, 1889, we may refer to a recent New York case, Romeyn *vs.* Sickles, 15 *North Eastern Reporter*, 638, in which an architect who undertook to draw plans for an apartment-house tried to hold the defendant personally liable, though he was only the promoter of a proposed club for the erection of the building, and the understanding between the parties had been that the architect's payment was conditional on the formation of the club or the building of the house by the defendant personally. The club was not formed and the defendant abandoned the scheme entirely. On these facts the Court of Appeals decided that the defendant was not liable for the plans. The following extract from the opinion shows the business-like view of such transactions that is taken by the courts of law, and the strong presumption of fact that in these cases the employer does not make himself liable except in the event of the building being commenced.

"We do not think that the evidence warranted the finding of the referee that the defendant agreed with the plaintiff to erect a building either by himself or through a club. . . . The inquiry in such cases always is what the parties would probably have agreed upon if the contingency had been within their contemplation at the time of making their contract. Suppose the plaintiff had said to the defendant: I am willing to rely upon your judgment and taste in the adoption or rejection of my plans, and to give you credit for their payment if adopted; but your plans are all in embryo, and I do not know whether you will finally build or not; I therefore insist upon your agreeing absolutely to build. Can the court say that the defendant would have entered into such an engagement? We think not. . . . Certainly nothing could have been further from the contemplation of the defendant than that he should be required to pay for plans which would prove useless to him, or that he should be compelled to proceed with the erection of a structure which he had never finally concluded to build, and it is not reasonable to suppose that the plaintiff believed that the defendant absolutely contracted with him to carry out plans which he knew were then immature and unformed. . . . An absolute contract to build was foreign to the object and design of negotiations with the architects, and was entirely unnecessary to the purpose which they all had in view. . . . It cannot be assumed that the employer intended, under such circumstances, to pay for the plans, unless they were of value to him, and were used in the construction of a building; and this view is strengthened by the further provision of the contract that in case they were adopted, such architect was thereby employed to superintend the erection of the building. The contract assumes the necessity of the erection of a building following the adoption of a plan as the consummation of the act of acceptance. That the defendant preferred the plaintiff's plans over those presented to him, falls short of what is required to constitute an adoption of plans for the erection of a building. This requires a determination to build as well as an inspection of plans for building. It constitutes something more than a mere mental emotion, and, in order to perfect it, demands a resolution to use those plans in the prosecution of work already determined upon."

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE STORY OF A STATE-HOUSE.

To the Editors of the American Architect:—

Dear Sirs,—It has recently been announced that the work of carrying out the enlargement of the Maine State Capitol at Augusta, has been awarded to Messrs. Brigham & Spofford, architects, of Boston, and the story of this whole recent agitation as to the location of the State Capitol building may be of some interest to architects generally.

There had developed throughout a large section of Maine a desire to have Portland made the Capital in place of Augusta. This desire the people of Portland had, naturally enough, been active in encouraging. The city is the one most accessible from the State at large, it being the railroad centre as it is unquestionably — to use a much abused expression — "the intellectual centre" of the State. The beauties of its surrounding scenery are great. All these considerations the citizens of Portland actively urged as reasons for locating a capitol building at Portland, the time having come when the accommodations afforded by the capitol at Augusta were entirely inadequate to the needs of the legislature.

The question being agitated of making alterations to the present capitol building, it was felt that now was the time for Portland to make her bid for the honor of being designated the Capital of Maine. Her citizens offered to the State the free gift of an ample lot of land on the famous Western Promenade, supplemented by a sum of $150,000 toward erecting on this lot a new state-house. This offer being declared, there was appointed by the legislature a committee of ten, to visit Portland and inspect the city. In anticipation of the arrival of this committee, plans for a capitol building were prepared by two firms of Portland architects. These designs were made on a basis of cost not to exceed $600,000, exclusive of furnishings. One of them, specially adapted to the lot on the Western Promenade, could have been built within the sum mentioned, while the other would not have exceeded it by more than $200,000 at the most. The committee having inspected the city and the designs presented by the Portland men, returned to Augusta determined to advocate strenuously the building of a new capitol at Portland, rather than the enlargement of the old capitol at Augusta. A day was set for a public hearing at the State-house, on the subject of transferring the Capital. On the day of this hearing, Portland people were present in Augusta in large numbers, urging in all honorable ways the claims of their city. Among their implements of persuasion were the two designs showing what manner of state-house would be recommended by Portland architects. The efforts of the Portland people on this day, coupled with the efforts of the committee of ten advocating removal, so impressed the members of the legislature, that a canvass, made a few days later, showed a majority in both houses in favor of locating a new state-house at Portland.

One day having proved insufficient for the hearing on this important subject now agitating all sections of the State, the hearing was adjourned to a date some days later; and it was at this meeting that the junior member of the firm of Brigham & Spofford, architects, rendered his first efficient service to the then minority party in the legislature opposed to removal. He was introduced by them as one of the architects of the extensive additions to the State Capitol at Boston — work already under way.

Having been thus introduced, Mr. Spofford proceeded to put the people of Maine on guard against the devices of their own architects, by declaring with the air of one having authority, that the designs submitted by Portland men, and there to be seen, would cost each a sum almost double that reported by their authors. Though his specific criticism was directed against the more costly of the two designs, he said nothing to prevent the public involving the other with his criticisms against the first. With the service thus rendered, the tide of sentiment in the legislature was in a few days turned against the claims of Portland, with her architects who were scheming to involve the State in reckless expenditure. When the question of removal was put to the vote, it was readily voted down; while an appropriation of $150,000 to repair and enlarge the present State Capitol was as readily voted in.

It is not surprising that the members opposed to the plan of removal should desire that some architectural authority be found to place at a very high figure the cost of executing the designs submitted by architects of Portland. It is not surprising that when this authority had been found, and had passed an opinion based upon the wishes of the opposition, rather than upon any fair and intelligent survey of the designs themselves — it is not surprising that, when this had been accomplished, the hearts of the opposition members should have gone out to the gentleman whose opinion had been of so much service to them.

On the day before the award of this work upon the Maine State Capitol to Messrs. Brigham & Spofford, several of the architects of Maine presented themselves before the Building Commissioners at Augusta. This was done in response to the following notice:

"The Commissioners on enlargement of the State Capitol will give a hearing at the State-house on Wednesday, April 3, 1889, to receive any plans or suggestions as to enlargement which may be offered. Architects and all others interested are invited to appear. For further information, address Secretary of the Commission on Enlargement of the State Capitol, Augusta."

A note sent by a firm of Portland architects, requesting certain further information, was answered by a written letter giving sizes of rooms required, etc. This was received four days previous to the hearing.

At this hearing, the treatment of the Maine architects by the Commission, of which Governor Burleigh is Chairman, was most courteous. It was also as just as could be expected of gentlemen not versed in the ethics of architectural competition.

The Commissioners were ready to allow the Maine architects to present plans in competition, but under such conditions of ridiculously short time and of awards as to constitute terms even less just than those offered in the competition for enlargement of the Massachusetts Capitol. The protest of the architectural profession against the terms of the Massachusetts competition, and the general refusal to engage in it, are events too fresh in memory to require more than passing notice here.

John Calvin Stevens, of Portland, acting as spokesman for the architects of Maine, declared to the Commissioners that it would be impossible to accept the terms offered, since at least two of the architects present had signed a published remonstrance against similar terms lately offered in Massachusetts, and had thereby bound themselves to have nothing to do with architectural competitions

conducted on such a basis. He then presented to the Commissioners terms under which architects might compete with dignity and with justice to themselves. These terms were as follows:

The Commissioners shall institute a competition with the following terms:

All drawings to be submitted under motto or device, in no case the names of authors to be shown upon the drawings, but to be enclosed in a sealed envelope marked with motto or device shown on plans.

A disinterested architect to be selected to assist the Commission in considering plans submitted, and award position in regard to merit.

Prizes to be given as follows:

First Prize — Carrying out the work at the usual rate of commission.
Second Prize — $ } Such sums as the Commission may
Third Prize — $ } decide.

Time for submitting plans shall not be earlier than May 4, 1889.

The architects of Maine did not ask any advantage for themselves. They asked merely that the work be thrown open to the competition of all architects in the country. In this competition the Maine architects were willing to take their chances.

As final result of the conference between the Commission and the architects, there was issued, two days later, this circular:

AUGUSTA, ME., April 3, 1889.

Dear Sir,— At a late meeting of the Commission on Enlargement of the State-House last evening, it was voted:

That the terms relative to a competitive trial for plans proposed by architects who appeared before this Commission to-day do not meet the approval of this Commission.

It was further voted:

That the Secretary be instructed to forward a copy of the above vote to each of the aforementioned architects.

Respectfully yours, C. S. HICHBORN, Secretary.

The Commissioners then awarded to Messrs. Brigham & Spofford, of Boston, without competition, the place of architects for the enlargement of the State Capitol at Augusta.

ALBERT WINSLOW COBB.

THE EFFLORESCENCE ON BRICKWORK.

BOSTON, MASS., April 8, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The writer has made some investigations of the "white efflorescence" on brickwork which may be of value to your readers, especially if they will aid him by sending samples obtained from their experience.

Four samples were examined, all from Brookline, and within a narrow space, a few rods in fact, of each other.

Two of these consisted mainly of carbonate of soda. These were from houses built at different times, one some four years ago, and the other more recently.

One, from the house of Mr. R. S. Peabody, architect, was chiefly sulphate of magnesia, and one was chiefly carbonate of lime.

The probability is, that the carbonate of soda is caused by the action of the lime of the mortar acting upon a silicate of soda in the brick, forming caustic soda, which, when it comes to the surface, is carbonated by the carbonic acid always contained in the air.

The presence of silicate of soda in a brick is often caused by the use of a *salt* clay, taken near the sea.

Sulphate of magnesia is generally due to the presence of pyrites in the clay, which, when the bricks are burned, changes to a sulphate, forming with the magnesia of the lime, a sulphate of magnesia.

The carbonate-of-lime sample was upon a very new house, and was merely the leaching of lime from the mortar, carbonated by the atmosphere.

These results all point to the fact that in all cases, so far examined, efflorescence is a combined result of the mortar *and* the brick.

The writer would suggest that it would be likely to lead to interesting facts if the architects would send him samples of efflorescences that they may observe.

Send a quarter ounce or more, if possible, and when practicable a piece of the brick used.

A perfectly impervious oily varnish will prevent these salts exuding from the surface, but linseed oil is not suitable alone.

Any samples to the undersigned will be carefully examined, *gratis*, and may lead to more light on this very interesting subject.

SAMUEL CABOT.

70 Kilby Street.

HAS THE STATE CAPITOL AT ALBANY SETTLED?

SAN FRANCISCO, CAL., March 21, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—At various times during the past few years, and since the completion of the State Capitol Building at Albany, N. Y., newspaper paragraphs have hinted at a settlement or cracking of that structure.

Is this true, and if so to what extent? In view of the fact that skilled engineering talent was employed in designing the foundations, and the methods adopted have been published, it would be of value to future constructors to know whether the work was a perfect success or not. "FOUNDATION."

[A story is occasionally circulated, apparently by newspaper reporters who find time hang heavy on their hands, that the Albany Capitol shows signs of sliding down the hill into the Hudson River. At times the matter has attracted attention enough to call for an investigation, but we believe that no indication whatever has yet been discovered that the ground under the building had yielded, nor has any sign appeared of a failure of the foundations, so far as we know, except under one or more of the piers supporting the vault over the Assembly Chamber, where a settlement is said to have been observed, which was attributed to the fact that a load which it was not calculated to support was brought upon it by the construction, or possibly by the movement, of the vault.—EDS. AMERICAN ARCHITECT.]

HOW TO MAKE A CELLAR WATER-TIGHT.

SALEM, MASS., April 2, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—I am making plans for a heavy brick building to be erected on "made" land near the sea. A cellar is to be made under part of it, the finished bottom of which is 2' 6" below high water-mark. Will you please tell me how this cellar can be made tight?

Yours truly, "SEAWATER."

[The common way of making such cellars tight is to drive sheet-piling around the outside, of three or four inch planks, tongued and grooved, or grooved and splined, set about eighteen inches from the outside of the cellar walls, and to fill in the space between the walls and the piling, to a depth somewhat below the cellar bottom, with a tough blue clay, or "boxing-clay," well-kneaded to make it homogeneous—this keeps the water out tolerably well, until the piles rot; and the bottom of the cellar is covered with concrete, to keep down the water which would otherwise force its way up from the subsoil. According to our experience, however, this cannot be depended upon to keep all moisture out of the cellar. Some will "weep" through the walls, when there is a pressure outside, and where the hydrostatic pressure is considerable, drops will force their way up through several inches of ordinary concrete. For these reasons, it is usual to provide "boxed" cellars with an outlet-pipe and a check-valve, arranged so that any water that may collect will run out at low tide, but will be prevented by the check-valve from coming back again. A more effectual, but expensive method is to line the cellar walls and floor with several layers of asphalted felt, mopped with melted asphalt. As the pressure of the tide would force this in, it must be held in place by lining the walls with brick-work or concrete, a foot thick or more, as high as the water is ever likely to rise outside, and by covering the floor also with thick concrete, or laying the bottom with an inverted arch of brick, and then levelling up with concrete. There are two or three contractors in New York who will undertake the latter process, and will guarantee its success. The clay-boxing is done by contractors in almost all seaboard cities.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

STATISTICS THAT HAVE INTEREST.—A German statistician says: There are at present 3,064 languages spoken by the inhabitants of our globe, whose religious convictions are divided between 1,000 different confessions of faith. The number of males is nearly equal to that of the females. The average duration of life is 33 years. One-fourth of the population of the earth dies before attaining the seventeenth year. Of 1,000 persons only one reaches the age of 100 years, and not more than six that of 65 years. The entire population of the globe is upward of 1,200,000,000, of whom 35,214,000 die every year; 96,486 every day; 4,020 every hour; 67 every minute, and 1 and a fraction every second; on the other hand the births amount to 31,792,000 every year; 100,800 every day; 4,200 every hour; 70 every minute; 1 and a fraction every second. Married people live longer than the unmarried, the temperate and industrious longer than the gluttons and idle, and civilized nations longer than the uncivilized. Tall persons enjoy a greater longevity than small ones. Women have a more favorable chance of life before reaching their fiftieth year than men, but a less favorable one after that period. The proportion of married persons to single ones is as 75 to 1,000. Persons born in Spring have a more robust constitution than those born at other seasons. Births and deaths occur more frequently at night than in the day time. It may finally be added that only one-fourth of the male inhabitants of the globe grow up to carry arms or perform military service.—*Paris American Register*.

EARTHQUAKE-PROOF HOUSES.—As foundations for a building, there are two types: In one, which is the European method of building, the structure is firmly attached to the ground by beds of concrete, brick and stone. In the other, which is illustrated in the Japanese system of building, the structure rests loosely on the upper surface of stones or boulders. As an indication of the relative value of these two forms of building, it may be mentioned that in Yokohama, in 1880, many of the European buildings were more or less shattered, whilst in the Japanese portion of the town there was no evidence of disturbance. The houses, like the foundations, are also of two types. In the European house built to withstand earthquakes, of which there are examples in Tokio and San Francisco, and for which in America patents have been granted, we have a building of brick and cement bound together with hoop-iron and numerous tie-rods. A building like this, which from time to time is jerked backwards and forwards by the moving earth, to which it is secured by the firmest of foundations, is expected to resist the suddenly applied and varying stresses to which it is exposed by the strength of its parts. This type of structure may be compared to a steel box, and, if its construction involves any principle, we should call it that of strength opposing strength. Some of the buildings in Caracas, which are low, slightly pyramidal, have flat roofs, and which are bound along their faces with iron, belong to this order. These so-called earthquake-proof buildings, with the exception of their chimneys, have certainly satisfactorily withstood small earthquakes in Japan. As to how they would withstand a disturbance like that at Cassamicciola is yet problematical. Unfortunately, these structures are very

expensive. The second type of building may be compared to a wicker-basket. This is certainly as difficult to shake asunder as the steel-box type, and at the same time is not so expensive. The Japanese house belongs to this type. It is largely used on the west coast of South America, and in Manila, since the disaster of 1880, it has rapidly been replacing the heavy stone form of structure. Briefly, it is a frame house with a light roof of shingle, felt, or iron. As put up in Japan, its stability chiefly appears to depend on the fact that it is not firmly attached to the earth on which it rests, and that its numerous joints admit of considerable yielding. The consequence is that, whilst the ground is rapidly moving backwards and forwards, the main portions of the building, by their inertia and the viscous yielding of their joints, remain comparatively at rest. A house that my experience suggests as being aseismic, and at the same time cheap, would be a low frame building, with iron roof and chimneys supported by a number of slightly concave surfaces resting on segments of stone or metal spheres, these latter being in connection with the ground. Earthquake-lamps, which are extinguished on being overturned, would lessen the risk of fire, while strong tables and bedsteads would form a refuge in case of sudden disturbances. In earthquake towns the streets ought to be wide, and open spaces should be left, so that the inhabitants might readily find a refuge from falling buildings. Brick chimneys running through a wooden building, unless they have considerable play, and are free from various portions of the building, are exceedingly dangerous. In consequence of the vibrational period of the house not coinciding with that of the chimney, the former, by its sudden contact with the latter when in an opposite plane of motion, almost invariably causes an overthrow. In 1880, nearly every chimney in the foreign settlement in Yokohama was overthrown in this manner, and the first alarm inside the houses was created by a shower of bricks falling on beds and tables. Since this occurrence, the chimneys in Yokohama have had more or less play given to them where they pass through the roofs. Chimneys with heavy tops, like heavy roofs, must be avoided. Another point requiring attention is the pitch of a roof. If this is too great, tiles or slates will be readily shot off. Archways over openings should curve into their abutments; otherwise, if they meet them at an angle, fractures are likely to be produced. If, for architectural reasons, or as a precaution against fire, it is necessary to have buildings which are substantial, their upper portions ought to be as light as is consistent with their requisite strength. Hollow bricks, light tiles, with papier-maché for internal decorations, have been recommended as materials suitable for superstructures. At the present time, the city of Manila, partly through Government interference, and partly through the desire of the inhabitants to reduce the chances of further disasters, presents a singular appearance of light superstructures rising from old foundations. Iron roofs are visible in all directions, whilst on the massive basements of old cathedrals and churches upper stories of wood, with cupolas and spires of corrugated-iron, have been erected. — *J. Milne.*

The Arch of Aurelius at Tripoli.— It is characteristic of Tripoli that the most remarkable monument in the whole town—one might almost say in the entire province—should be so hidden away amid a litter of squalid and unsightly hovels that a careless observer might easily let it pass unnoticed. Indeed, more than one student of Mr. Murray's red-bound Koran has left Tripoli under the impression that the "Arch of Aurelius" exists no longer, having doubtless expected to see something like the Arc de Triomphe at Paris or the Brandenburger Thor at Berlin or the "Gate of Tiberius" at Ancona. But the wonder is actually there for all that. Picking your way along one of the narrower streets that lead up from the harbor, you are struck with an indefinable something in the aspect of a shapeless block of masonry on your right, which impresses you sufficiently to make you halt and take another and a closer look at it. This second glance reveals to you, in the midst of the rough stones and rubble with which Turkish barbarism has filled-in and blurred its magnificent outline, the grand sweep of a noble classic arch, which, with its massive blocks and its smooth, symmetrical masonry, asserts itself unmistakably through all the unsightly chaos around it. And there on its side, distinct in every line as when it came from the carver's hand 1,725 years ago, the ear of Roman conquest, whirled along by the mythical she-wolf with which Rome's history commences, is seen rushing like a hurricane over the necks of prostrate nations. A crafty-looking old Tripolitan gentleman in a greasy blue robe and soiled white turban, with a face like a badly-made piece of chocolate, comes slouching up as soon as he notices that you are examining the monument, and gives you to understand (in a queer jargon of mingled Italian and Arabic, eked out by profuse gesticulation) that there is still something more to be seen. And so indeed there is, for the old fellow promptly unlocks a low plank door, and in another moment you find yourself standing right underneath the famous arch, and looking up at it from the inside. It is naturally somewhat of a shock to you to discover that the interior of this splendid monument of the Classic age, erected in honor of one of the greatest rulers of ancient Rome, is now used as a storehouse for casks of flour and potatoes. But all thought of this profanation is quickly lost in the contemplation of the grand old relic itself. Seventeen centuries of storm and battle have failed to dislodge one block from its walls or to shake down one stone of its roof. When it first rose above the Mauritanian palm trees Christian martyrs were being thrown to the lions in the newly-built Colosseum at Rome and painted savages were hunting wolves over the future site of London. Since that time the Roman Empire has vanished from the earth and the savage "Britanni," who were Virgil's chosen type of the lowest barbarism rule thrice as many lands as the proudest Cæsars, while a new world of which the boldest classic navigator never dreamed has arisen to spread its renown over the whole. But although the very site of Aurelius's palace is now unknown and Aurelius himself is but a dim historical phantom, this strange old monument of his greatness still stands here like a tombstone of Rome's departed glory, the same yesterday, to-day, and forever. — *David Ker in the New York Times.*

Cremation in Paris.—Everything is being done in Paris to induce people to have their dead bodies burned. A new crematory has just been constructed, according to the plans of M. Goullard, a municipal counsellor. This furnace is entirely of brick, and its partition-walls have in their entire length a series of holes which give passage to large metallic tubes through which gas is let in by force, having been pumped into the furnace by means of compressed air. The temperature under such conditions is as high as 1,300° to 1,400°. The results obtained have been satisfactorily convincing. In thirty-five minutes an entire sheep, weighing fifty kilos and placed in a wooden box, was reduced to ashes, without the slightest smoke or smell. — *N. Y. Commercial Advertiser.*

TRADE SURVEY

Fortunately for both employers and workmen, a truce, practically speaking, has been declared for the season and no general disturbance of the existing friendly relations is to be feared. In some quarters the workmen were inclined to make trouble, but just now the leaders among them are more bent upon making their organization compact than to organize strikes or allow them. It is safe to go further and say that the leaders are more conservative than they have ever been and for several reasons, one of which and the latest one, viz., that they are coming to recognize that more strikes do not avail so much after all. Another reason is, that more of the control of labor organizations is passing into American hands, and the foreign element is losing some of its power. The considerable falling-off in membership during the last year or two has been due in a measure to the disposition of American workmen not to be under foreign control. Those familiar with the internal commotions in many of our national labor organizations know this to be the cause of much of the numerical weakness occasioned of late. Employers as a rule have less apprehension from the control of Americans than foreign-born workmen in some labor organizations. Even now there is a wide divergence of opinion as to the wisdom of a general eight-hour movement next year. Lines are being drawn, the foreign element in most places leading in the agitation for a reduction and the Americans following. In Great Britain the movement has much greater force, and promises to be the pivotal question which will decide the election of a score of members of Parliament at the next election. While trades unionism has grown rapidly on this side within two or three years, it has not the same territory to work in or the same problems to solve as the workmen of Great Britain. Eight-hour laws have been enacted in several States and they remain a dead letter. That a more or less general movement will be inaugurated by labor next year cannot be doubted but if the present inharmony of opinion continues as is probable it will, to a very great extent at least, the movement will do no more than to postpone work in some directions and stagnate business in others. The error about to be made is in not consulting employers. Already large employers are endeavoring to hedge against it. Some weeks ago 4,000 men were reduced to eight hours in a great railroad shop. This week the employer of 1,500 mechanics reduced all to eight hours in order to continue all in employment. This course will be prudently resorted to by all who can conveniently do so and long enough before the date fixed for the inception of the movement that there will be no observed connection between the policy and the movement. The fact is the old labor leaders have suffered so frequently from defeat when they were assured of victory, that they are cautious about leading new movements. Conservatism is apparent in speeches, acts, and management.

The improving industrial conditions in Great Britain and on the Continent will check the immigration movement from this one, and decrease the surplus labor in American cities and towns. To that extent it will favor the movement for a reduction of hours of labor, but facts and conditions like these seldom enter into labor counsels or decisions. The trade conditions are neither better nor worse. Last week the Eastern nail-makers submitted a proposition to manufacturers to make twenty-five per cent less, and this week a favorable vote was made on it. The merchant steel-makers have failed to renew their combination but, as a rule, the twenty or thirty small associations in the iron trade are holding together, restricting production, and waiting for the good time coming, when there will be two buyers for the same product. The wood-working machinery-makers have not effected a general combination, owing to the unwillingness of some of the smaller and widely-scattered concerns to come in. Architects in Western cities have started since the first of the month on a great deal of new work for public buildings, and a number of city architects have emigrated into small Western towns, where their practical services are in demand. The demand for nearly all kinds of materials is now very active; bricks, particularly, are wanted fully as fast as they can be delivered in all markets. Lumber is increasing in activity in all markets. Poplar remains under the control of Southern manufacturers. Yellow pine is strong and active, and large deliveries are being made. The short-log crop is helping prices. Hemlock holds its own, and spruce, for the reason above given, will not be shaded as much as usual. The money market is easy, even with a drop in the surplus reserves to about one million dollars—above the legal limit—a few days ago. A temporary exportation of gold to offset diminished imports was predicted in some financial quarters on Tuesday. The Treasury-bond policy will be continued, at some cost to the Government, but there is a compensating benefit in easier monetary conditions. The volume of business, taking the country all through, is increasing. Prices keep low, and this is advantageous to the masses, although occasioning much unfair complaint among manufacturers and exchangers of values. The increasing interest given to the creation, or rather extension, of an export trade is encouraging, but nothing but radical measures and persistent and well-directed effort will enable Americans to wrest even a small share of the world's trade from the nations who now practically control it. If purely business, instead of political, considerations could prevail in State councils, the battle would be half fought. As we reach nearer and nearer the completion of our general internal development, we will devote more and more attention to securing our share of the commerce of the world. American machinery and special products have found their way into more markets of the world than is popularly supposed, and our commercial competitors, who know our capabilities even better than we do ourselves, are making strenuous efforts through statecraft and through commercial enterprise to head us off as far as possible.

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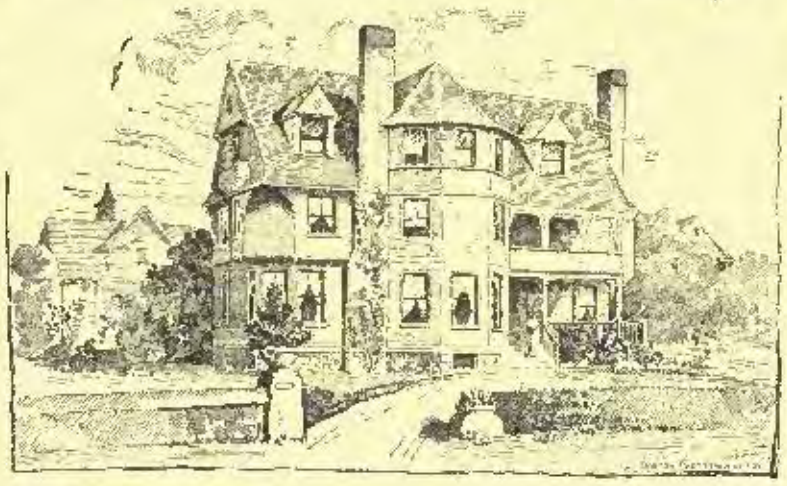

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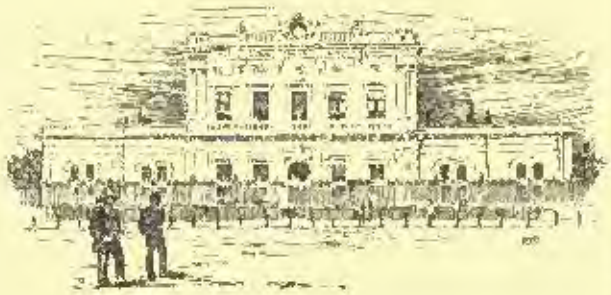

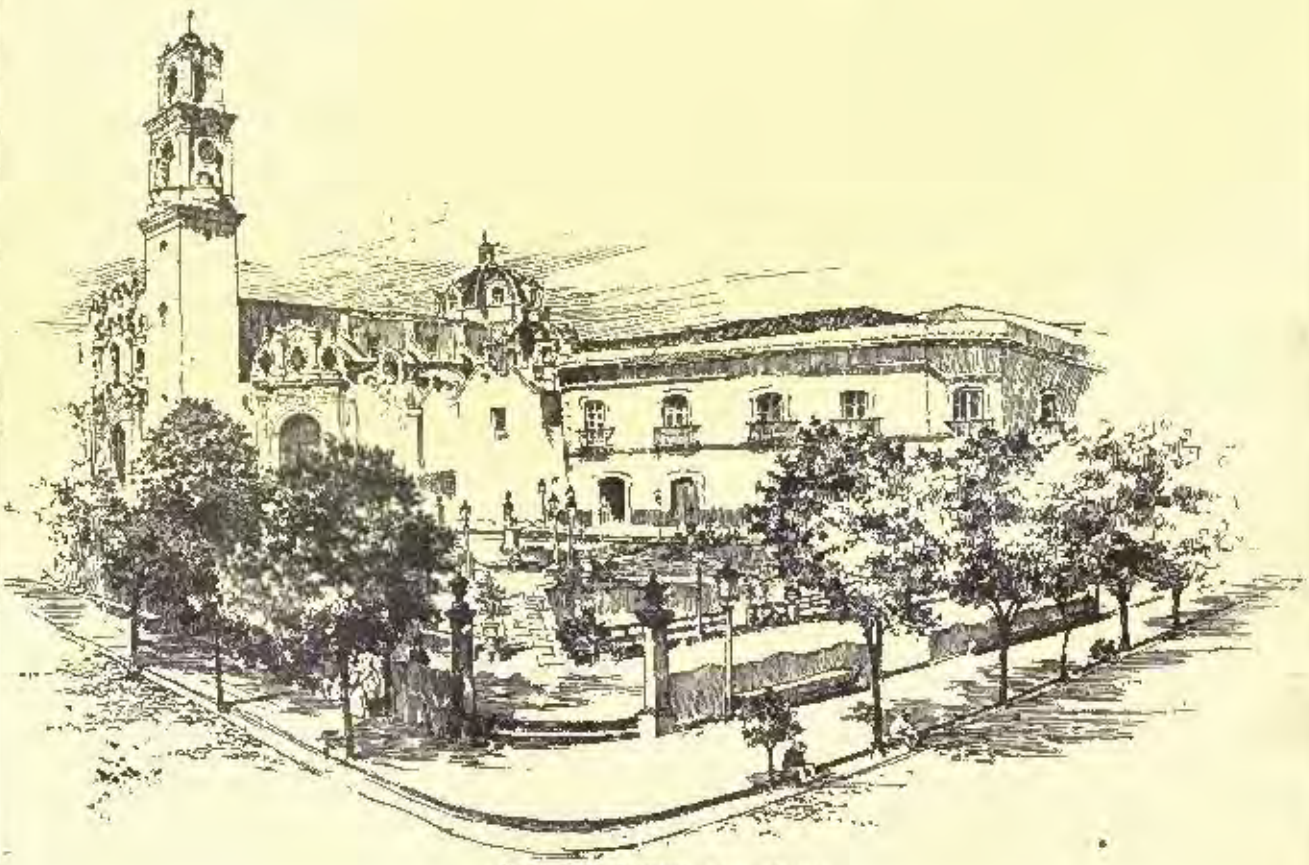

Church of St. Francisco, Jalapa, Mexico.

MEXICAN SKETCHES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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APRIL 20, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE competition for the Lowell City-hall and Memorial Library, which interested a good many architects in Massachusetts, has resulted in the award of the first prize to Mr. F. W. Stickney, of Lowell. Mr. Stickney's design is said to have been a very good one, but the principal importance of the matter lies in the fact that it is reported that it will not be carried into execution. The programme of the competition said that "it was expected that if the appropriation for the City-hall was made within a year, the author of the design placed first would be employed to superintend the execution," or words substantially to that effect. Undoubtedly, the sentence did not amount to a positive promise that the author of the design considered best should be appointed architect of the building, but it must have been understood as a virtual promise, or architects of Mr. Stickney's standing would have had nothing to do with the affair, and if he is to meet with the humiliating treatment that common report predicts for him, it seems to us that the Commissioners, some of whom are widely known as men of honor and reputation, can do no less than explain clearly and publicly why they feel obliged to withdraw from a stipulation which undoubtedly did more to attract competitive drawings than anything else in their programme.

ACCORDING to the New York *Times*, the competition for the new cathedral has resulted, so far, in the selection of four designs by the Trustees, followed by the postponement of the whole matter until a committee of experts, comprising two architects and one engineer, shall have examined all the designs *de novo*, and shall have reported upon them to the Trustees. If their judgment shall agree with that of the Trustees, there will be nothing left to do but to declare the result, or to arrange for the second and final competition which is said to have been proposed. If the experts should not agree with the Trustees, we suppose that further discussion will be necessary. Fortunately, there is no great haste about the matter, and the more thought is given to the plans, the more satisfactory will be the final result. According to the *Times*, the choice of the Trustees has fallen upon four Gothic designs, so that the news that the "Gothic style was dead" seems not to have reached them.

EVERY one will regret to hear of the death of the venerable Samuel Carter Hall, F. S. A., who, as "S. C. Hall," attached his name to nearly all the best and most useful work in the way of popularizing the art of architecture which was done in the middle of the present century. His beautiful book, the "*Baronial Halls of England*," is probably the one by which he is best known to architects, but this is only one out of some three hundred and forty books which were either written by him, or published under his care and direction, to say nothing of the innumerable articles which he contributed to the *Art Journal*, which he founded and edited for forty-six years. He was born of a good family and educated as a lawyer. For a time he eked out the scanty income of a young barrister by reporting the debates in Parliament for the newspapers, and from this beginning drifted wholly into literature. At the age of twenty-nine, after one successful literary venture, he succeeded the poet Campbell as editor of the *New Monthly Magazine*, and four years later brought out the first number of the *Art Journal*. This had at first a struggle for existence, and it was many years before he succeeded in bringing it to complete success. In later life he was prominent in public charities in London, and leaves a name which will be long remembered and honored.

IT is a good thing for young architects to have their attention called occasionally to the history of the lives of the more prominent men in the profession, so that they can distinguish for themselves the qualities and habits which lead to the various sorts of rewards, in the shape of honors, riches or selfish pleasures, which form the object of men's ambition. Among the many biographies of the kind which, after the French custom, are published in the professional journals, one of the most interesting is that of Felix Langlais, contributed to *L'Architecture* by M. de Joly. Langlais, one of the best-known architects in Paris, was the son of a soldier. Being naturally strongly inclined to the study of architecture, he was entered as a pupil in the office of Labrouste, and made rapid progress in the art under the tuition of that great man. In his twentieth year, the Revolution of 1848 interrupted his studies, and called him home, where he found himself obliged to take up some active employment to provide a living for himself and others. He was employed first on the works of construction connected with the railway from Paris to Lyons, and was attached, six years later, to the construction of the Exhibition building of 1855. After this he was employed as clerk-of-works upon the public buildings of Paris, and spent several years in the midst of the great building operations which signalized the administration of the Third Napoleon. While engaged in this occupation he found time to do a little business as an architect on his own account, but a regulation was established, forbidding architects employed by the city to undertake any private business, and, finding that he must give up either his public employment or his small private business, he wisely preferred to keep the latter, and resigned his post under the city. He had already built a country-house of some importance in Southwestern France, and was architect to the small Ardennes Railway. A year or two after his retirement from the public service, he was commissioned to build the immense warehouses of Bercy, midway between the Lyons and Orleans railway stations. About the same time, he was engaged to build a house in Paris for the rich family of the Hardons. This house, which was situated on the road to the Bois de Boulogne, attracted the attention of the Rothschilds, who, learning the name of the architect, soon began to bring him commissions. His first work for the family was the enlargement of a house in the Rue Monceaux, built for M. Eugene Pereire, and afterwards sold to Baron Adolphe de Rothschild. This he altered, adding some splendid galleries, and soon afterwards the Baroness Nathaniel de Rothschild entrusted him with the restoration and alteration of the old château of Vaux de Cernay. This work was carried out very successfully, and he built two more country-houses, one for the Baron James-Edward de Rothschild, and the other for Baron Edmund de Rothschild, who also employed him to build a magnificent house in Paris. These various buildings for the Rothschild family attracted the notice of other wealthy persons, and, besides the Hardons, who were almost his first clients, he was employed by the Pereires, the founder, by-the-way, of the Transatlantic Steamship Company, and by many others. The patronage of these wealthy and influential people, with his own prudence, brought him fortune, and he died a rich man, but much more than that, he died so happy in family affection, in the respect and esteem of his associates, and in his charitable, as well as professional occupations, that no one thought about his success in accumulating money. Next to his work

as an architect, and as referee in building cases, which were often assigned to him by the courts, his principal interest was in the improvement of the condition of the working classes, particularly in a moral sense. He was himself a deeply religious man, and, as one means for helping the poor to a better moral state, he engaged actively in the work of the Association for securing the observance of Sunday as a day of rest.

WHILE Eiffel tower continues to be the hero, so to speak, of various adventures. According to *Le Génie Civil*, which is its official biographer, a story was circulated not long ago in Paris to the effect that it had begun to lean. The outline of the structure makes it very difficult to see whether it is vertical or not, and the rumor spread rapidly, until it came to be asserted that the tower would soon resemble the leaning tower of Pisa, to which it was constantly compared. There was no reason whatever to suppose that any movement had taken place, but the public solicitude became serious enough to make it advisable to have the matter tested, and two engineers were sent with theodolites to make a careful survey. As there are no vertical arrises in the tower, the method of observation employed was to trace the intersection of two vertical planes meeting at right angles in the centre of the tower, and bisecting each face. This was done, and the two theoretical planes were found to divide the faces of the tower with almost perfect symmetry, showing that the shaft was not inclined in any way from the vertical. On three of the sides the curvature was found to be exactly as designed, while the fourth side showed a hollow amounting to about an inch of deviation from the intended line.

IN another article the tower is the aggressor, instead of being the victim of outside malice. It seems that the structure seems to be a work of art like a picture or a statue, and to be, therefore, entitled to the benefit of the statutes for the protection of artistic property. Whatever rights of this kind may appear to have been assigned to a M. Jallard, who has undertaken to defend its reputation by warning that all persons who sell photographs, models, pictures, or engraved drawings of it, and to the owner must pay him a royalty on such sales of twenty per cent on the price. No pictures and photographs, except those of Gaudin, Berger, Salmon, or Guillemet, and no [illegible] thereafter [illegible] Parisian loyalty would [illegible] very unfortunate [illegible] of the heroes [illegible] to pay, so that the whole question of the right of the structure to the protection accorded to pictures and poems is now before the tribunals, and the result will be awaited with some curiosity.

THE *Sanitary News* quotes from the *British Medical Journal* a description of a simple test for arsenic in wall-papers. No apparatus is required beyond a gas-fixture, which is to be turned down until it burns entirely blue. A strip of the paper to be tested is then cut off, one-sixteenth or an inch wide, and one or two inches long. As soon as the strip is brought in contact with the interior of the gas-flame, if arsenic is present, the flame will be colored gray. On taking the strip out of the flame, and holding it, still smoking, to the nose, if arsenic is present the fumes will be found to have the characteristic garlic-like odor of arsenic. After the paper is removed from the flame and has ceased to smoke, the charred end should be examined. If it shows the black of the carbonized fibre covered with a reddish film, and, on placing it a second time in the flame, a green color is produced, copper may be assumed to be present, and, by implication, arsenic, as arseniate of copper is the poisonous pigment to be feared in dangerous wall-papers.

M. MARIETTE gives, in *La Semaine des Constructeurs*, an account of the manufacture of plaster-of-Paris at the quarries near Paris which has a certain value for our architects, who, although they do not employ that material so freely as their brethren across the Atlantic, at least like to know how to tell whether it is of good quality or not. According to him, the best way to try whether plaster-of-Paris, as delivered at a building, is properly burned, is to handle it. If it is underburnt, and therefore likely to give an incoherent, weak hydrate with water, it will feel harsh to the touch, no matter how finely ground it may be. If it is overburnt, it will also feel gritty, but if the burning has been continued just long enough, it will be unctuous and velvety to the touch, and will leave a white spot on the skin. It will surprise many people to learn that the calcination of gypsum may be, and often is, effected at a temperature below the boiling point of water. In fact, the proper temperature for calcination lies between one hundred and seventy-five and two hundred and fifty degrees Fahrenheit, so that the process is rather one of drying than of real calcination. It is, however, effected by burning, a fire being kindled at the bottom of a heap of gypsum blocks, and pushed sufficiently to heat the nearest blocks to redness. These are thus very much overburnt, and the outside pieces are underburnt, but all are ground together, and if the burning has been judiciously managed, the entire product is good. In Paris, the plaster used in building is rather coarsely ground, and is considered stronger in that condition, but plaster for finishing work, as well as that shipped to a distance, is ground very fine, and sifted through a silk bolting-cloth. Among us, plaster is an expensive material, found only in the Maritime Provinces and in the far West, and is used mainly for finishing, and for cementing marble or tiles, but there is a good deal of room for improvement in the manufacture of the American plaster, and architects should not hesitate to demand the best results that the material is capable of furnishing.

AN improvement has recently been introduced into the design of boilers which promises to effect an important economy in the production of steam. An article in *Le Génie Civil*, by M. Lissonne, a retired director of naval constructions, describes some experiments made with a boiler furnished with tubes having ribs, or flanges, on the inside, so as to present a larger surface for absorbing the heat of the fire. The projection of the flanges is about one-quarter of the diameter of the tube, and eight of them are spaced at equal distances around the inner surface. The tubes, which are the invention of M. Henri Serve, of Vitry, are now drawn by special machinery out of brass, so that they require no soldering, and are strong and easily cleaned. The first experiments with them were made in a steamboat on the Rhone. At first with copper tubes of the ordinary kind were carefully watched, and it was found that the combustion of one pound of coal would evaporate seven pounds of water while the temperature of the smoke as it issued from the boiler was six hundred and eighty Fahrenheit. The tubes were then taken out and replaced with M. Serve's tubes, and the evaporation immediately rose to nine and one-third pounds of water for every pound of coal consumed, and the temperature of the escaping gases fell to four hundred and sixty degrees. These results would seem to indicate a very great economy in consumption of coal; and some other experiments, in which the quantity of coal consumed was observed, showed an actual saving of twenty-four per cent in coal. At the naval arsenal in Brest some further tests were then made by officers of the Government, with the result that with exactly the same boiler the economy of coal effected by using the flanged tubes in place of smooth ones was, with a given quantity of water evaporated, fourteen per cent, while with forced draught the economy was eighteen per cent.

THE *American Florist* describes a piece of glazing-work which appears to be quite novel, and certainly commends itself to persons who may be in search of original effects in decoration. A florist in Connecticut, having occasion to renew the glazing of his greenhouse, bethought himself that he might save a little money by using for the purpose glass that had already seen service of some sort, instead of buying new. He therefore applied to a photographer of the neighborhood, and made a contract with him for some thousands of old negatives of suitable size for his purpose. The negatives were delivered, and their new proprietor found great satisfaction in arranging them in groups, according to their subjects and other circumstances. The pictures of old gentlemen and ladies he placed by themselves, where they could keep guard together over a certain portion of his plants. Next came the middle-aged persons, sorted in a suitable manner, and lastly the children, smiling in groups in a sunny corner. For the amorous views a special place was reserved, and the pictures of young persons taken hand-in-hand were collected over a heliotrope-bed, which would, it was confidently expected, attain remarkable luxuriance under their influence.

BUILDERS' HARDWARE.[1]—XXIII.

CYLINDER LOCKS.

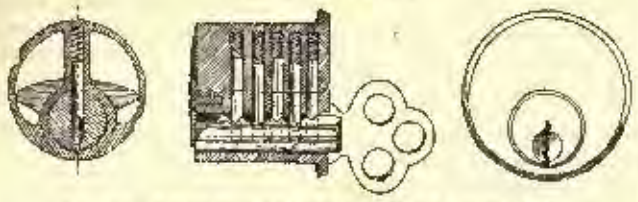


Fig. 336. Mechanism of the Yale Lock. Yale & Towne Mfg. Co.

WHILE broad and general principle which distinguishes the ordinary lever-lock from the style of lock manufactured under the Yale patents, is that in the latter the mechanism upon which the key directly operates is entirely distinct from the lock itself, being enclosed in a cylinder or escutcheon. The function of the key consists simply in so arranging certain movable pins, slides or other obstructions, that the mechanism is free to rotate, and by its movement, to operate on the locking-bolt. This variety of lock is by no means without a prototype, as we have already seen in the case of the "Egyptian," the "Bramah" and the "Cotterill" locks; but in its application it has been simplified and reduced to a marketable form chiefly in this country, and can be fairly claimed as a product of American ingenuity.

Linus Yale invented the lock which bears his name, about thirty years ago. His original patents covered substantially only the use of a flat key to operate a locking mechanism, a series of vertical pins of unequal lengths being lifted by means of certain ricks or irregularities on the upper edge of the key, so that the ends of the pins were brought on a line. Within recent years an important change has been made in the construction of the Yale escutcheon. The slot through which the key reaches the pins is now cut in sharp corrugations, the key being corrugated longitudinally so as to exactly fit the slot. By this simple device, the "Yale" locks have been rendered practically proof against any but the most expert lock-pickers. The external appearance of the "Yale" lock is presumably familiar to every one, but the internal construction will require some explanation.

Figure 336 shows a cross and a longitudinal section through a typical Yale escutcheon, together with the exposed face of the same. It will readily be seen that the action of the mechanism is very simple. There are two barrels or cylinders, one rotating within the other, but eccentric with it. When the key is withdrawn the lower cylinder is held from rotating by means of five sets of round pins which are fitted in vertical grooves extended partially through the two cylinders, and pressed constantly downward by five bar springs. In each groove are two pins of unequal lengths, one over the other. When the proper key is inserted all the pins are raised simultaneously, but to varying heights, so that the joints between the upper and the lower pins are brought exactly on a line with each other. It is evident that as the inner cylinder, categorically designated as the plug, is exactly fitted to the bore in the shell, an almost imperceptible variation in the height to which any one of the pins is raised, will prevent the plug from turning: whence it follows that an immense number of locks can be made with this mechanism without duplication. From this results the unrivalled capacity of the "Yale" lock for permutations, with its proportionate safety against any accidental interchange of keys.

It will be seen that in this lock the key acts only as an adjuster of the pins. Motion is communicated to the locking-bolt of the lock simply by means of a hub on the back of the rotating plug, or, in the case of a rim-lock, by a flat key extending from the plug through the door. Some of the opponents of this system consider that in it, too much is demanded of the key, but when the locks are otherwise as nicely arranged and evenly balanced as the "Yale & Towne" goods are usually found to be, the amount of twisting strain required to move the bolt is really not a great deal. In no well-made lock should there be any great strain on the key, much less in such a device as this, wherein there are no strong lever-springs to work against.

It will easily be appreciated that this device has almost revolutionized the lock-trade in this country. Not only has it opened the way for many valuable inventions of a similar nature, but it has stimulated the perfecting of the ordinary lever-locks, and was instrumental in the abandoning of the old style of heavy door-keys, so that one's pockets are no longer burdened with such keys as were thought indispensable forty years ago.

The advantages claimed for the Yale lock are as follows:

First, a key of the smallest size and most convenient form.

Second, immense capacity for changes or permutations, so that more thousands of changes are possible than an equal number of dozens with the old systems.[2]

Third, great safety against picking.

Fourth, uniformity of size of the key for locks of all kinds and for all purposes.

Fifth, protection against accidental interchange of keys by reason of the great capacity of the lock for permutations.

In regard to the third point claimed, it must be remembered, however, that with all its security the Yale lock does not offer an exception to the general rule that any lock can be picked which is operated by a key. Still, very few persons have the nicety of touch necessary to raise the pins by means of fine instruments inserted through the key-hole, and bring them exactly to the position necessary for moving the plug. There are experts who claim to be able to open any "Yale" lock which has been made, but for all practical purposes a lock of this sort affords absolute security, as the time required to pick it renders it very unlikely that any thief would be so indiscreet as even to make the attempt.

It will be understood that the zig-zag corrugations extend entirely through the length of the plug. In a measure, this feature prevents any duplicate key from being manufactured by persons not authorized to do so, as it requires very heavy and specially made machinery to produce one of these keys, and unless the corrugations exactly correspond with the lock, the key cannot enter. The plugs are cut by a peculiar form of band-saw specially designed by the manufacturers; and altogether it seems as if every precaution had been thought of which could render the lock more inviolable.

Like a great many other successful inventions, the Yale locks are remarkable for their simplicity. The whole of the mechanism being practically combined in the escutcheon, there is no necessity for any complicated system of levers or springs in the lock proper, and there remains very little to get out of order. The older plugs, made with a straight slot, would allow a certain amount of vertical play to the key, so that it would rock in the cut and would not always exactly lift the pins; besides which the slot permitted the lock to be picked with comparative ease. This is entirely obviated by the corrugated slot, as already explained. It will be noticed also that the lock is not in any way dependent upon the springs, as the pins would act by gravity, even should the springs give out entirely.

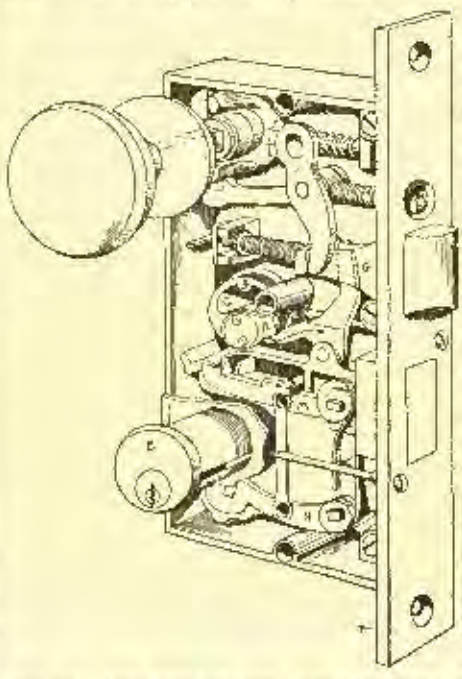


Fig. 337. Yale Front-Door Lock. Yale & Towne Mfg. Co.

It would seem almost an impossibility to master-key a series of Yale lock, and yet it is accomplished in two different ways. The first is to fit each lock with a separate master-escutcheon, practically making a double lock, though both sets of escutcheons act on the same locking-bolt. By this method a million locks could be master-keyed in a single series, if desired. The second way is to use three pins in each slot

[1] Continued from page 148, No. 692.

[2] Assuming that a variation of one-fiftieth of an inch in the length of a pin is sufficient to lock the plug, 267,334,200 locks can be made on this system, no two of which can be operated by the same key.

instead of two, the lengths of the pins being so adjusted that, throughout the series, the upper joints can be brought on a line by the master-key, while the lower jointings are all different, and fitted to the individual room-keys. This method necessitates a larger and more cumbersome plug and cylinder, and is seldom used.

Yale locks are manufactured in all styles and for all purposes, but the escutcheon is always arranged in exactly the same manner, whether intended to operate a night-latch or a desk-lock. The variations consist mainly of differences in the form of the latch or of the lock. A single example will be sufficient to illustrate the whole. Figure 337 represents one of the most perfected forms of Yale front-door lock. *C* and *B* are the two escutcheons, each with a cam, *R*, attached to the back of the plug. *M* and *N* are two levers hinged to the bolt-tail. *L*, *F* is a bent lever, hinged to a flange of the bolt-tail, and catching under a hub on the bolt of the latch. The dead-bolt can be operated from either side, the cams first depressing the levers so as to pass the post, *S*, and then shooting out the bolt in the same manner as with an ordinary key. When the dead-bolt is unlocked the end of the lever *F* takes the position shown by the figure. If the cam *R* is then turned to the left, it so acts on the lever as to cause it to draw back the latch, *G*. Consequently a single key serves both to unlock the dead-bolt and to draw back the latch.

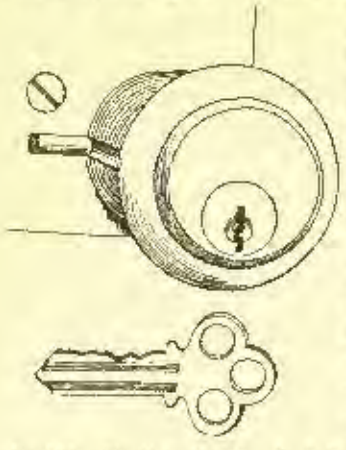


Fig. 338. The Harvard Lock. P. & F. Corbin.

The "Yale" lock has, of course, won for itself a host of imitators in the hardware trade. The closest approach to the "Yale" system is embodied in an escutcheon lock manufactured by P. & F. Corbin. Figure 338 illustrates this. The internal arrangement is exactly the same as in the "Yale" lock, so far as relates to the pins, etc., but the plugs are cut with square-edged, instead of zig-zag slots. These slots, also, are not carried entirely through the plug, but extend only through a thin face-plate, behind which is a wide slot exactly like that of the original "Yale" locks. This seems like an imitation of, but in nowise an improvement on the original, and is considered by the Yale & Towne Manufacturing Company as an infringement on their patents.

Figure 339 illustrates the "Foster" lock, manufactured by A. G. Newman, a very ingeniously devised lock, which is harder to pick than the "Yale," and, as put on the market,

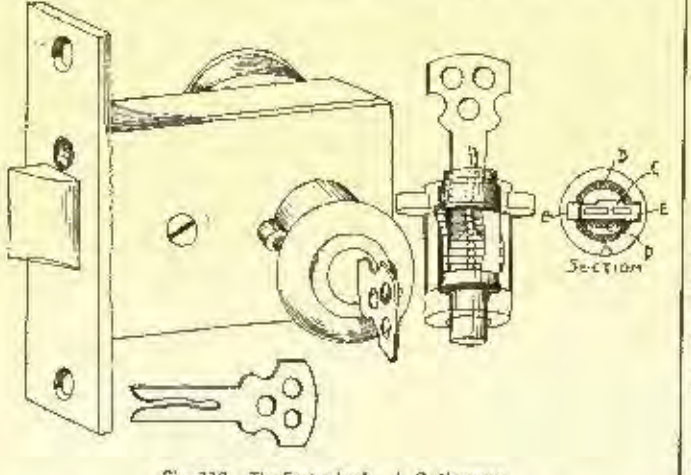


Fig. 339. The Foster Lock. A. G. Newman.

shows the greatest of care in workmanship and finish. The cross-section of the escutcheon shows the internal construction. The outer shell, *A*, is fixed to the lock-case. The plug, *B*, is hollow, and fitted with ten slides *C*, which work through cuts in the side of the plug and catch in slots, *E*, *E*, cut in the shell, so that the plug cannot rotate until the slides are withdrawn. Half of the slides protrude from the plug towards the right and half towards the left; each slide being fitted with a small brass spring, *D*. The key is cut with an irregular cleft, and the slides are cut out, with a cross-piece near the centre. The cross-pieces, and the sinuosities of the cleft in the key are so mutally spaced that when the key is inserted all of the slides are drawn in and the ends no longer protrude but are flush with the surface of the plug, which is then free to rotate. It is believed that this lock is unique of its kind, and, though in outward appearance much like a Yale lock, it is decidedly original in every other respect.

A form of cylinder-lock has recently been put on the market by the Hopkins & Dickinson Manufacturing Company, which partakes somewhat of the nature of the old "Bramah" lock, previously described. Figure 340 illustrates the external appearance as well as the internal construction of the escutcheon or cylinder, whose functions are the same as in the Yale lock. The shell, *A*, is secured to the lock-case so as to be immovable. The plug, *B*, rotates inside of this, being held in place by screws, *C*, turned through the outer shell. Inside of the plug are five slides, *D*, working in a closely fitted groove, with a separate spring to each slide. The springs are on opposite sides, in separate slots, so that there is no chance for the slides to rock. The key is flat, with five notches on the end corresponding to the five slides. It is inserted through a straight slot in a capping-piece, *E*, and bears against the bottom of slots in the centre of the slides. At the back of the plug is a

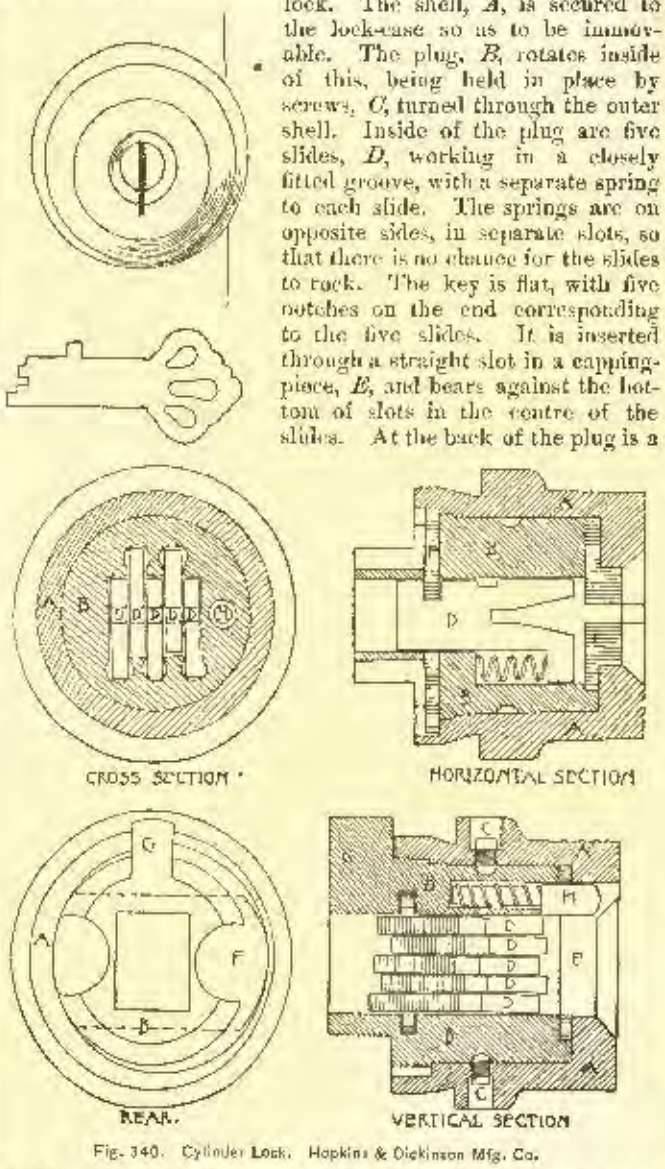


Fig. 340. Cylinder Lock. Hopkins & Dickinson Mfg. Co.

flat piece of metal, known as a fence, *F*, working up and down in grooves, with a hole through the centre sufficiently large to allow the ends of the slides to protrude by it. The top of each slide has one notch in it the same width as the thickness of the fence, at varying distances from the key-hole, besides one or more false notches of lesser depth. The plug is extended with an arm, *G*, by which the lock-bolt is operated.

The mechanism operates as follows: The fence is in the plane of an eccentric groove or ward cut on the back of the shell, as shown by the figure. This eccentric groove is so located with reference to the centre of rotation of the cylinder that when the plug is turned, the longer arm of the fence is forced to one side, the amount of eccentricity being sufficient to firmly wedge and hold the plug, in case the fence should not be free to move laterally. When the key is inserted, a shoulder on it first presses back a pin, *H*, which works in a slot so as to hold the plug and the shell together and prevent accidental rotation. The cuts on the end of the key then force back the slides in such ratio that all the deep notches are

brought exactly on a line with the plane of the fence. The key is then turned, rotating the plug, bringing the fence to bear against the walls of the eccentric groove, and forcing it down into the notches of the slides, these notches being of sufficient depth to allow the fence to entirely follow in the eccentric groove. The arm, *G*, can thus operate on the locking-lever.

The shallow notches on the slides are intended as a safeguard against picking. By turning the plug with a knife blade, the fence can be brought to bear against the slides. Slight inequalities in the width of the slides cannot be avoided, and the widest slide will bind most firmly against the fence, so that by depressing the slides successively with a fine pick one might in time be able to catch all the notches over the fence, and so undo the lock, were it not for the false notches which are so confusing that it is extremely difficult, and for most persons, impossible to pick the lock.

Many improvements have been made in the mechanism of this lock during the past six months, and the most thorough study and care has been given to perfect it in every way. The first samples put on the market were deficient in many respects, but the lock as now offered to the trade is about as perfect in every way as anything of the kind which has thus far come before the public. It has excelled everything except the Yale locks, and indeed there is little that can be said of the "Yale" which does not apply with equal force to the Hopkins & Dickinson cylinder-lock. It is well-made, compact, not liable to get out of order, easily repaired and practically burglar-proof.

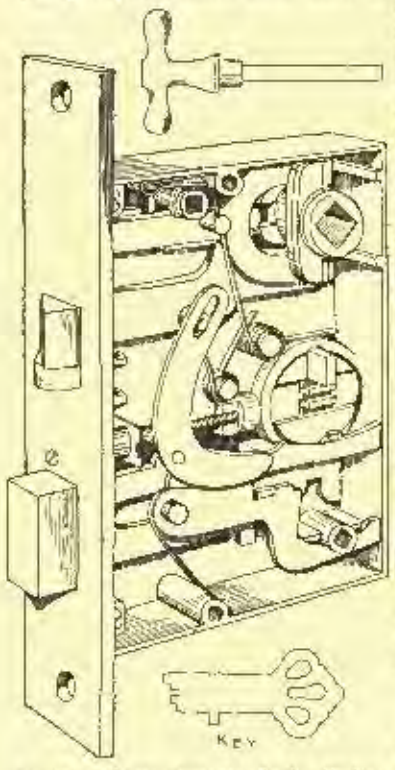


Fig. 341. Cylinder Front-Door Lock. Hopkins & Dickinson Mfg. Co.

Figure 341 illustrates an adaptation of this escutcheon to a front-door lock. The works are ingeniously arranged so that the key will operate both the dead-bolt and the latch, while at the same time the dead-bolt can be shot back by a turn-button and spindle from the inside of the door. The illustration is too clear to require any detailed description. This kind of escutcheon or cylinder can, of course, be applied to any form of lock, though thus far it has been used by the manufacturers only in connection with front-door and office-door locks.

The patents to a very interesting cylinder-lock are controlled by the Yale & Towne Manufacturing Company. The

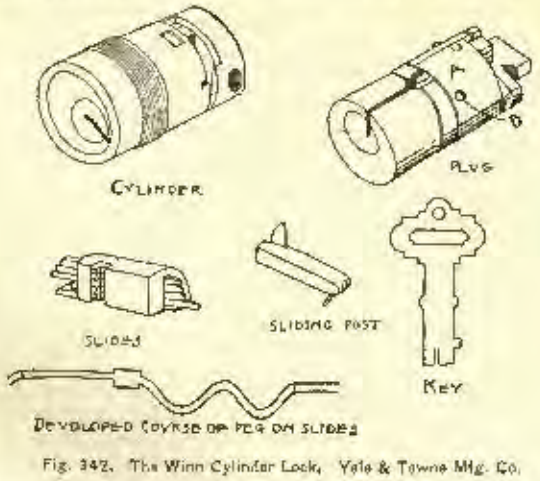


Fig. 342. The Winn Cylinder Lock. Yale & Towne Mfg. Co.

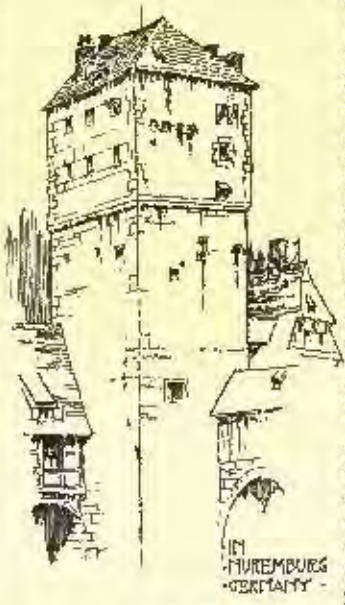
"Winn" lock, Figure 342, is so peculiar in its workings that even after taking it apart it is hard to follow the movements it makes in unlocking. The outer cylinder is secured to the lock-case and to the door, so as to be immovable. Inside of it rotates the plug, a section of which is cut away to allow for a slide-holder, *A*, which is free to move in and out. Inserted in the face of the holder is a pin, *B*, projecting sufficiently to catch in a groove which is cut out from the inner surface of the outer cylinder-barrel, the groove following a waved line, so that when the plug is rotated, the slide-holder is first drawn away from the key-hole, then back, then away again. The slides are flat pieces of steel, one-twelfth inch wide at the ends nearest the key-hole and one-sixth inch at the other, and are each notched on one edge, at varying distances from the end. There is also a sliding-post which passes through the plug behind the slides, which is a little longer than the diameter of the plug, so that one end of the post must project through a short slot in the outer cylinder-barrel. The key, when inserted in the plug, sets the slides by means of the nicks on the end, bringing the slots exactly on a line. The plug being then rotated, the peg, *C*, carries the slides and the slide-holder away from contact with the key, the notches remaining set on a line. After performing a quarter revolution with the plug, the projecting end of the sliding-post encounters an obstacle tending to force it out on the opposite side of the plug, and the notches on the slides being on a line, a fence on the sliding-post slips into the notches, and the plug can continue to rotate. Before a complete revolution is effected, the slides encounter a fixed obstacle which forces them back to their original position, the alignment of the notches being destroyed. The connection between the plug and the bolt of the lock is the same as in all the cylinder-locks.

A little reflection will convince one how futile would be any attempts at picking this lock. The key simply sets the slides and acts as a lever to rotate the plug. The slides are all pointed on the ends towards the key, and a very slight experience is sufficient to show that the lock cannot be picked at all. Indeed, this is the worst thing about it from a commercial point of view, as few people care to have a door-lock so impregnable that the door has to be broken in every time the key is lost.

There are several other styles of cylinder-locks, in which the key operates on levers instead of pins; also several varieties which have much the same appearance as the Yale locks. None of these, however, present any striking peculiarities, and being used more for cabinet work than for doors, they hardly came within the scope of this discussion.

[To be continued.]

THE SEPULCHRE OF AMENEMHAT III.



About a month ago was reprinted in these columns from the London *Times* an account of the opening of the Hawara Pyramid in the Fayûm by Mr. Petrie, the well-known explorer. News now comes from the same source that Mr. Petrie has succeeded not only in cutting an entrance into the sepulchral chamber of Amenemhat III, but in searching every accessible part of the structure. He has thus turned every fallen block, and cleared away the sand and mud accumulated during many centuries. The lost secrets of the monument have, in fact, been brought to light.

In the sepulchral chamber had been found two empty sarcophagi. The smaller of these Mr. Petrie at first conjectured to have been made for the King's son and successor, Amenemhat IV, or possibly for the King's daughter, Sebaknefru, who succeeded her brother, Amenemhat IV, and ended the twelfth dynasty. But it now proves, says the writer in the London *Times*, to have been made for another daughter, Princess Ptahnefru, who probably died about the same time as her father, or, at all events, previous to the closing of his pyramid. This Princess is new to history; her name, Ptahnefru, or "the perfections of Ptah," being composed on the same lines as that of her surviving sister, Sebaknefru, or "the perfections of Sebak." A large alabaster vessel, eighteen inches in length, curiously carved in the shape of half a trussed duck, and engraved with a hieroglyphic inscription

signifying "the royal daughter, Ptahnefru," was found in one of the passages a day or two after the opening of the pyramid, and with it three similar vessels, smaller and quite plain.

Two days later, as the work of clearance went on, a superb alabaster table of offerings, surrounded by the broken fragments of nine more alabaster duck vases, was unearthed from beneath the rubbish in a kind of anteroom adjoining the sepulchral chamber. This beautiful work of ancient art is described by Mr. Petrie as "a rectangular block measuring 36½ inches in length, by 17 in breadth and 9 in thickness." It is bordered all round by a funerary invocation of the ordinary type, praying for oblations of food and drink for the "*Ka*" of the royal daughter Ptahnefru; the inclosed surface being carved in low relief with 110 representations of miniature vases, bowls, cups, plates, loaves, cakes, birds, fruits, and the like. Each object has its name engraved beside or above it, thus giving a list of between 70 and 80 varieties of wines, poultry, cakes, etc., and placing us in possession of the complete menu of a royal funerary feast *circa* B. C. 2800. Oddly enough, the ducks, geese, and other birds shown in this interesting list are represented without legs, probably for economy of space. Mr. Petrie says:

"There is a flake off one corner of the block, but it is otherwise as perfect as the day when it was first engraved. It is a lovely monument, new in its details, and new as to the Princess whom it commemorates. It also shows that Ptahnefru must have been the daughter of Amenemhat III, and sister of Sebaknefru. We had a hard job to get it out of the pyramid, as it weighed 400 pounds, and had to be hauled up all sorts of slopes and holes, and twisted round all sorts of corners. Being alabaster, not a rub or a knock could be allowed upon it."

The mummies of the great Pharaoh and his daughter were burned to ashes by the original spoilers of the pyramid, who shall say how many centuries ago? Mr. Petrie carefully cleared out the two sarcophagi with his own hands (both being under water), and found at the bottom of each nothing but a deposit of charcoal mixed with grains of quartz and a quantity of scales of mica. The charcoal showed that the wooden mummy cases and their occupants had been burned, but the quartz grains and mica scales puzzled him sorely. The discovery of a fine lapis-lazuli inlay, carved in the form of a false beard of the kind represented on the chins of gods and Pharaohs, explained the mystery a day or two later. It showed that the destroyed mummy cases had been decorated with mosaic ornamentation in fine stones, which, when calcined, would have produced precisely the residuum found in the charcoal.

The scattered fragments of some six or eight alabaster bowls and vases were also recovered from the rubbish on the flooded floor of the sepulchral chamber. These represent the funerary vessels of the great Pharaoh himself, whose throne-name was found on a fragment fished out of the water when the chamber was first opened. The newly-discovered pieces are mostly inscribed, and, as they are apparently mendable, their legends may once more be read, and will possibly be of historical interest. These fragments, together with an extraordinary number of broken amphoræ of Roman date, complete the brief list of objects discovered inside this pyramid, which it has cost the explorer so much time and labor to open.

The sepulchral chamber of Amenemhat III proves to have had no door and no entrance. The largest sarcophagus must have been placed in position and the smaller one constructed before the whole of the roofing-slabs were laid on, the exit having been closed when the funerary rites were ended by dropping the last slab into its place. As these slabs weigh from forty to fifty tons each, the security of the dead might well be deemed eternal. The presence of the Roman amphoræ shows, however, that the passage from the labyrinth was open in the time of the Cæsars; and it is possible that the pyramid may have remained inviolate up to that period.

How many centuries have elapsed between the raid of the last plunderer and the systematic siege carried on by Mr. Petrie is beyond the reach of conjecture; but it may safely be predicted that the last resting-place of the Labyrinth Pharaoh is not likely to be invaded by many future travellers. Its last treasures being removed, the spoiler will not longer be tempted. Its problem being solved, it offers no enterprise to the man of science. Neither will it long remain accessible to the mere tourist. The passage from the labyrinth will soon be choked again, and its place will be forgotten; and Mr. Petrie's tunnel, which was never very safe, and is now very dangerous, will shortly cave in, if it has not done so already.

In the meanwhile, Mr. Petrie, whose appetite for pyramids seems to grow by what it feeds upon, has removed to Illahún, there to attack another of these stupendous royal sepulchres, which, according to old tradition and modern report, has never yet been opened.

"Spanish Cedar."—A tall man walking down Chestnut Street, laughingly responded to the inquiry of a friend as to what he was doing: "Sawing Spanish cedar boards in West Virginia for cigar-box makers." To the remark that no Spanish cedar grew in West Virginia he replied: "And not enough anywhere else for the demand. We saw up poplar logs into thin boards, and the cigar makers dye them brown with cedar extract that gives the boxes proper color and odor." The logs are sawn with ribbon-saws that make little sawdust to waste. Nearly all boxes used by American cigar-makers are made from this wood.—*Philadelphia Inquirer.*

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

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[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATES 42 AND 43.—ST. MARY'S, ILMINSTER; ST. AUGUSTINE'S, HEDON; ST. MARY'S, MALVERN; ALL SAINTS', OAKHAM; SS. MARY AND NICHOLAS, SPALDING; ST. MARY'S, SAINESHEAD.

[Issued only with the Imperial Edition.]

THE AGE OF FRANÇIS I, PLATE 5.—CHAMBER OF MARIE DE' MEDICI, BLOIS.

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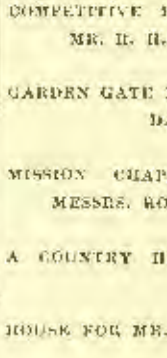
BALTIMORE



BALTIMORE AS A BUILDING-CENTRE.—PROPOSED ALTERATIONS IN THE COURT BUILDING.—HOW CITY OFFICIALS DISREGARD PRIVATE RIGHTS.

We may not inappropriately deal rather more with mere matters of statistics, as gleaned from the usual official department summaries and journalistic comments—in the first regular letter of the year from Baltimore, than it would perhaps be found interesting to do later on or frequently. Nothing can prove more conclusively how easy it is to compass the ruin of the most enviable reputation, hitherto held quite above suspicion, or upon how frail a foundation the character for veracity may be established, for it becomes only a self-evident proposition that "figures will lie"; and when such statistics touch upon matters of comparative population, bases of taxation, building permits, areas and increase of values, we doubt if even our venerated great national parent himself would prove immaculate, or if the blind goddess would not put a false weight into her scales with the bandages torn from her eyes.

For example, there has been a great deal of local newspaper exultation, during the last month or two, in articles headed "In the Front Rank," etc., over the fact that figures show Baltimore as standing fifth "*in the number of dwellings among the cities of this country*," and that since 1880 she has stood, side by side with St. Louis, first in the list "*in rate of increase in dwellings*" ahead of New York, of Philadelphia, of Boston, of Chicago, etc. But one has no sooner received the impression naturally given by such statements as those we have italicized, when one meets with another tabulated set of facts which, in a list of twenty-six, places Baltimore about sixth in rank in "the number and cost of new buildings," and further states, "It will be observed that *as to the number of operations*, Philadelphia leads every city given by a very large majority." It is perhaps needless to state the locality whence this bit of news

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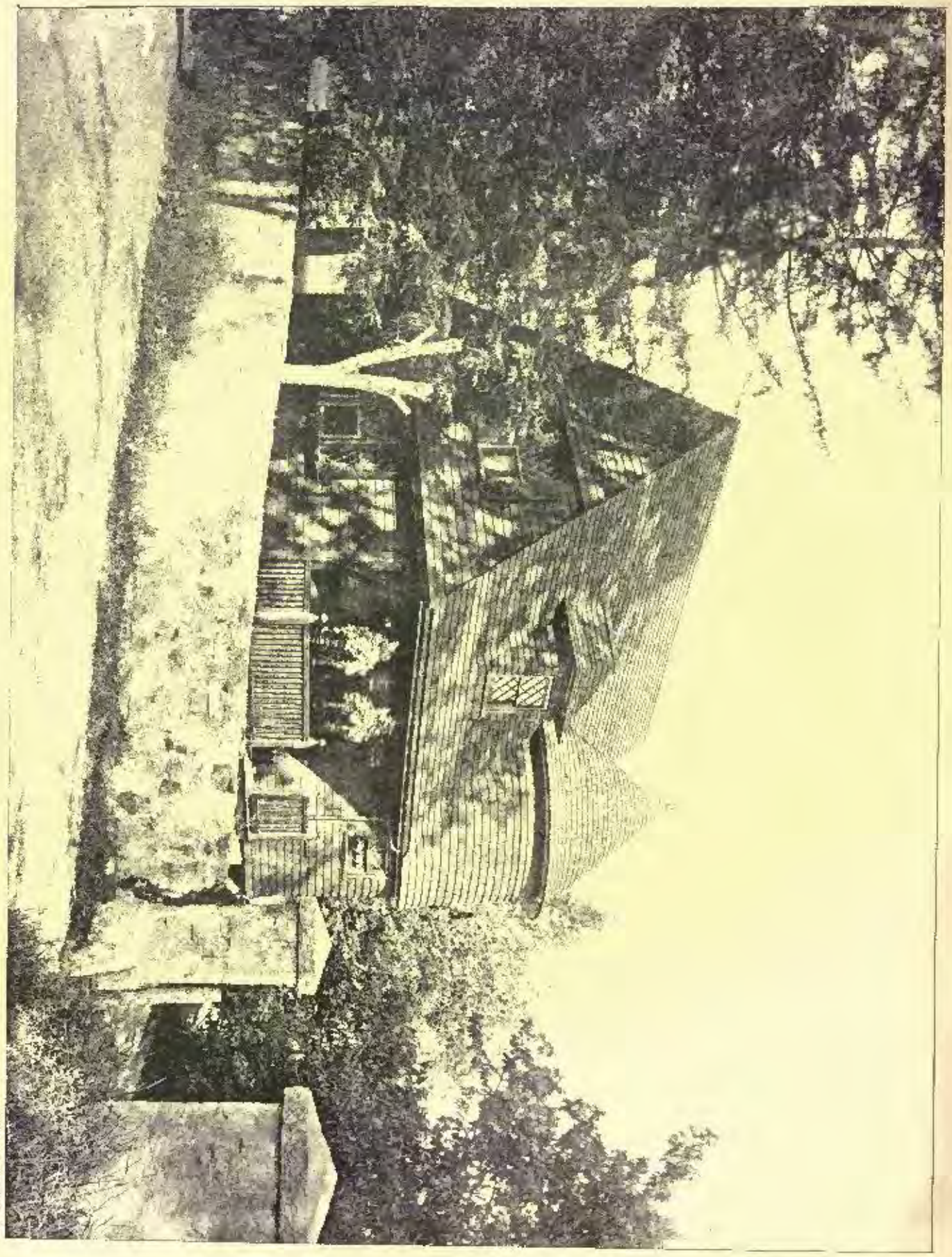

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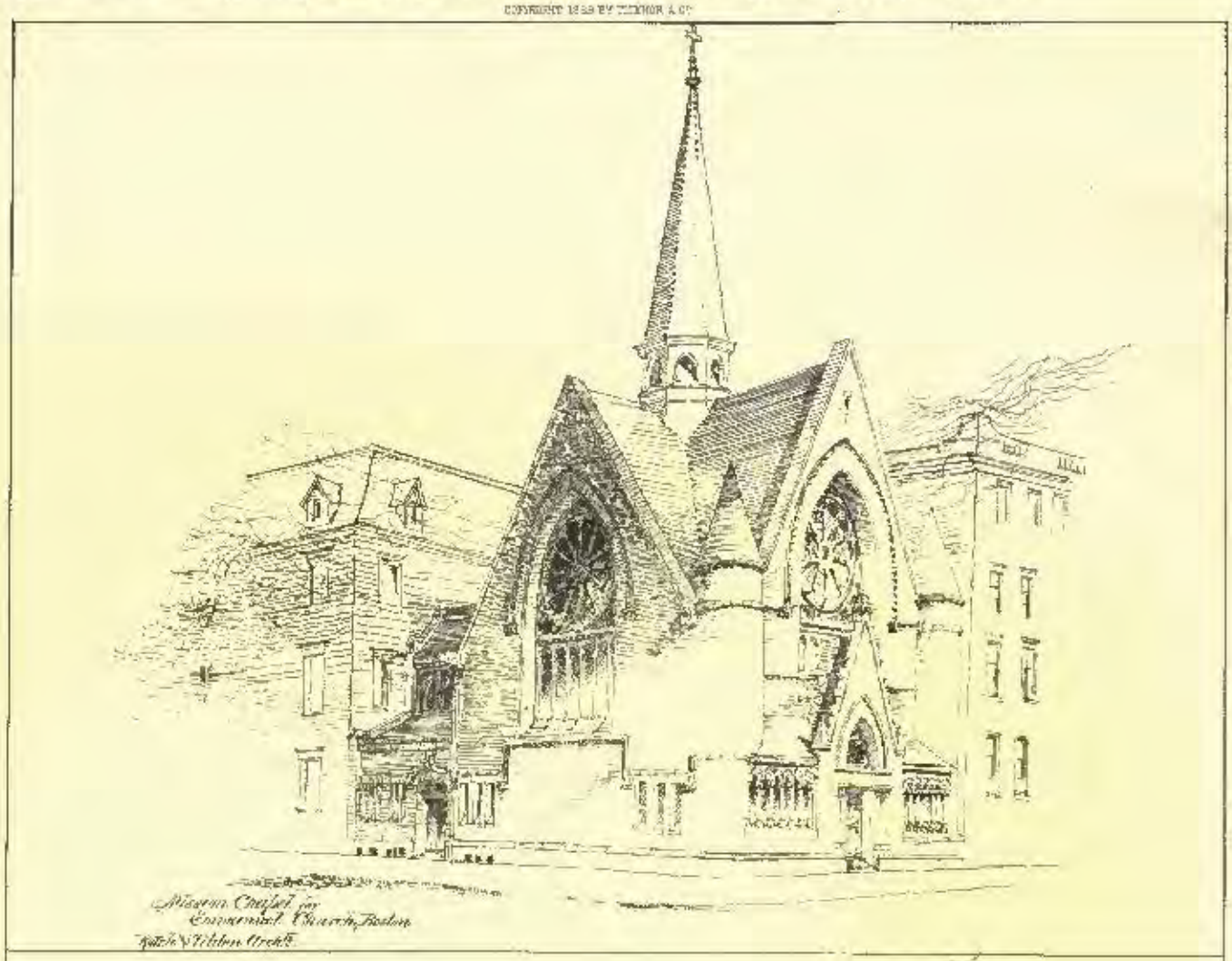
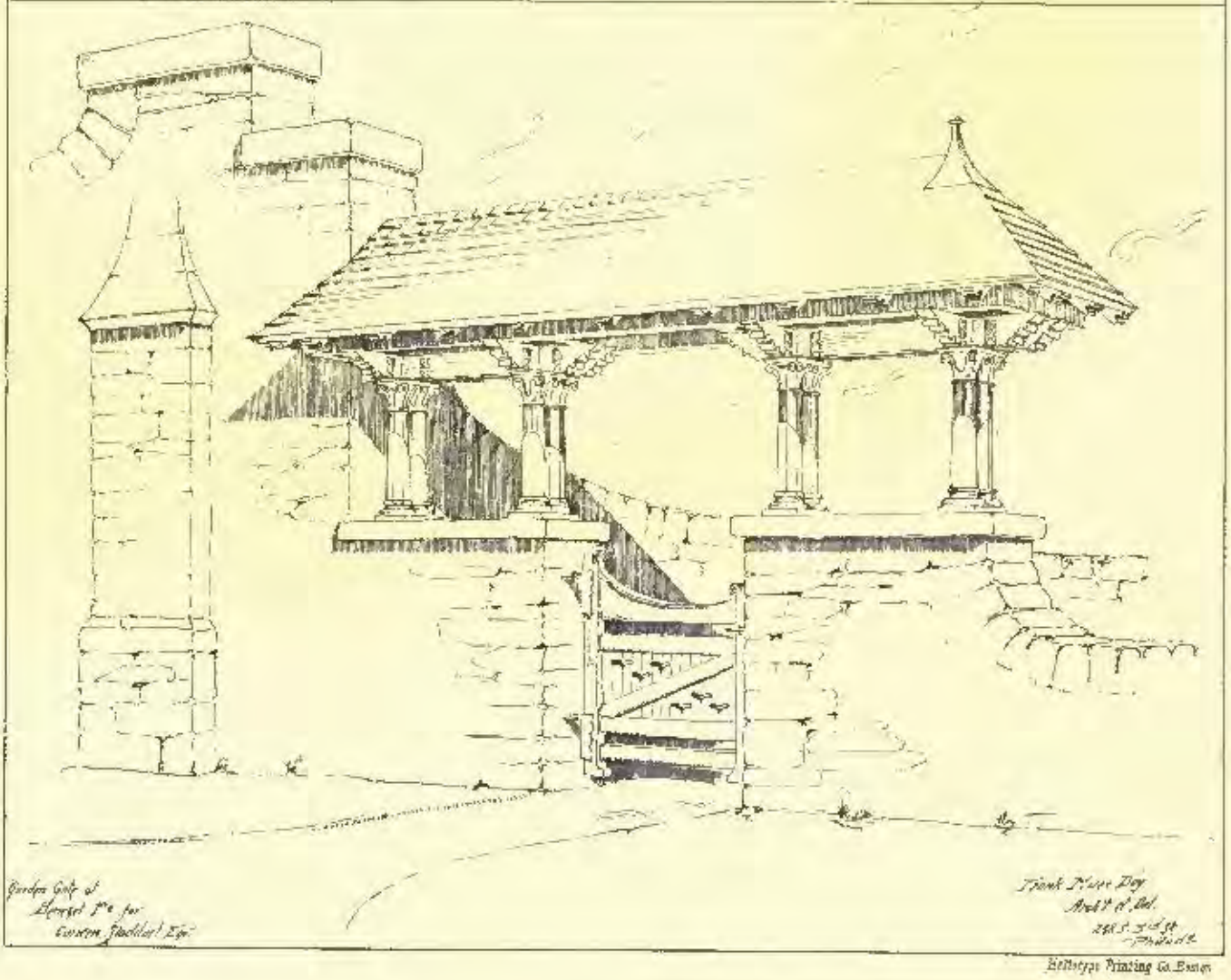


Mission Chapel for Emmanuel Church, Boston
Ketch & Wilden Archts.



Garden Gate at Hemlock Pt. for Curtis Stadtdel Esq.

Frank Miles Day Archt. of Del.
248 S. 3rd St. Philada.

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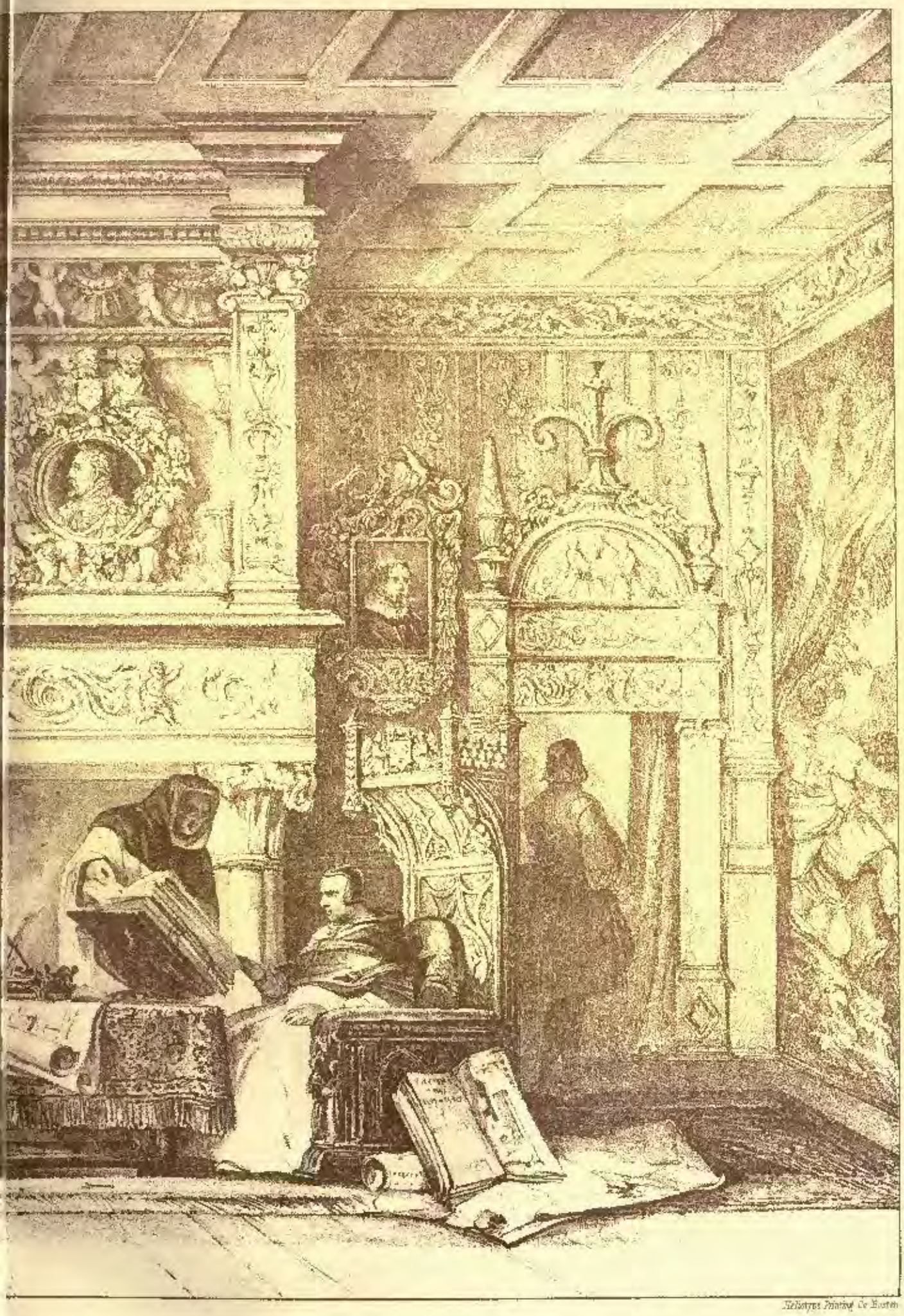

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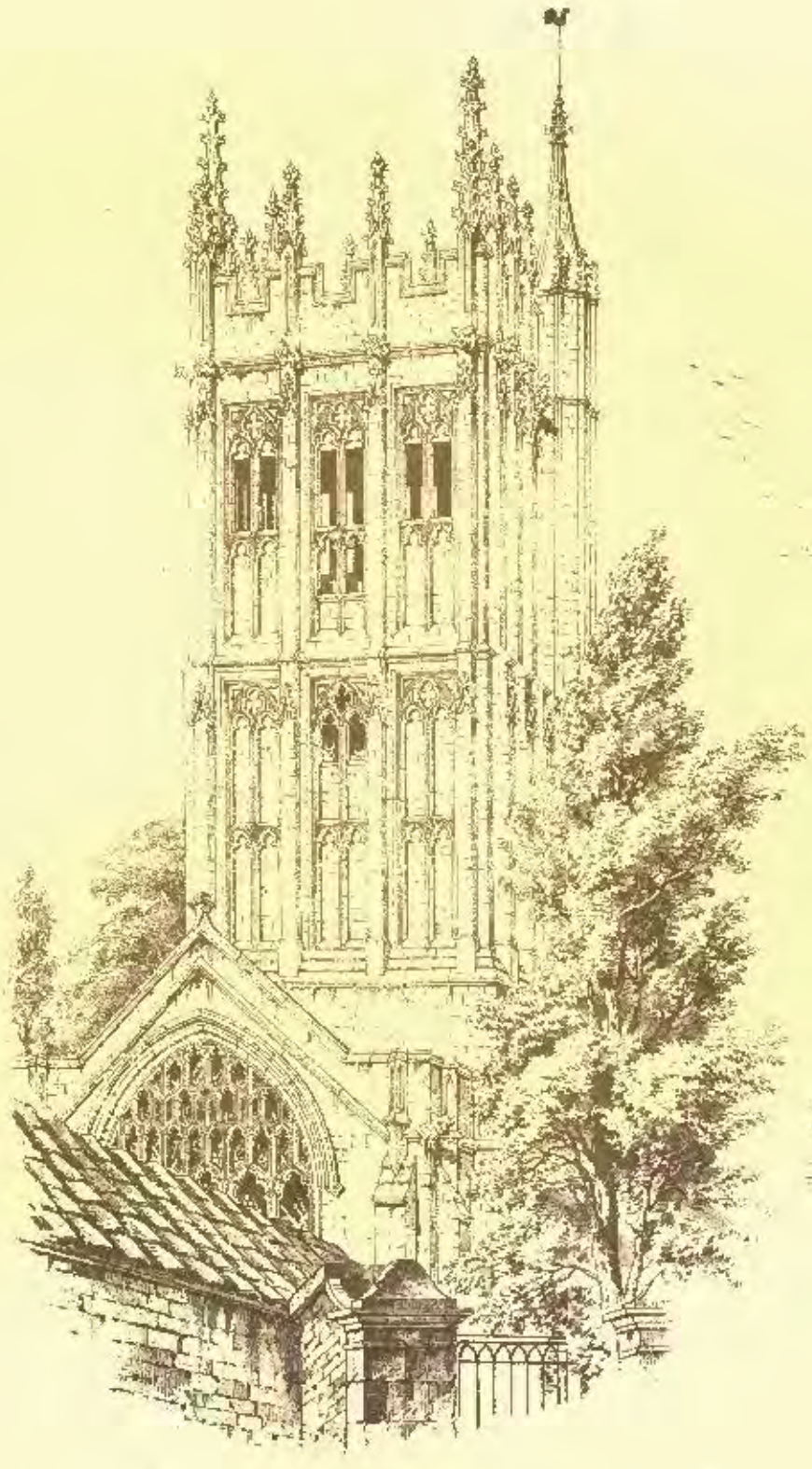

Saint Mary's Cleeve,

Somersetshire.

Saint

Saint's, Nedon,

shire.

Saint Mary's, Malvern,

Worcestershire.

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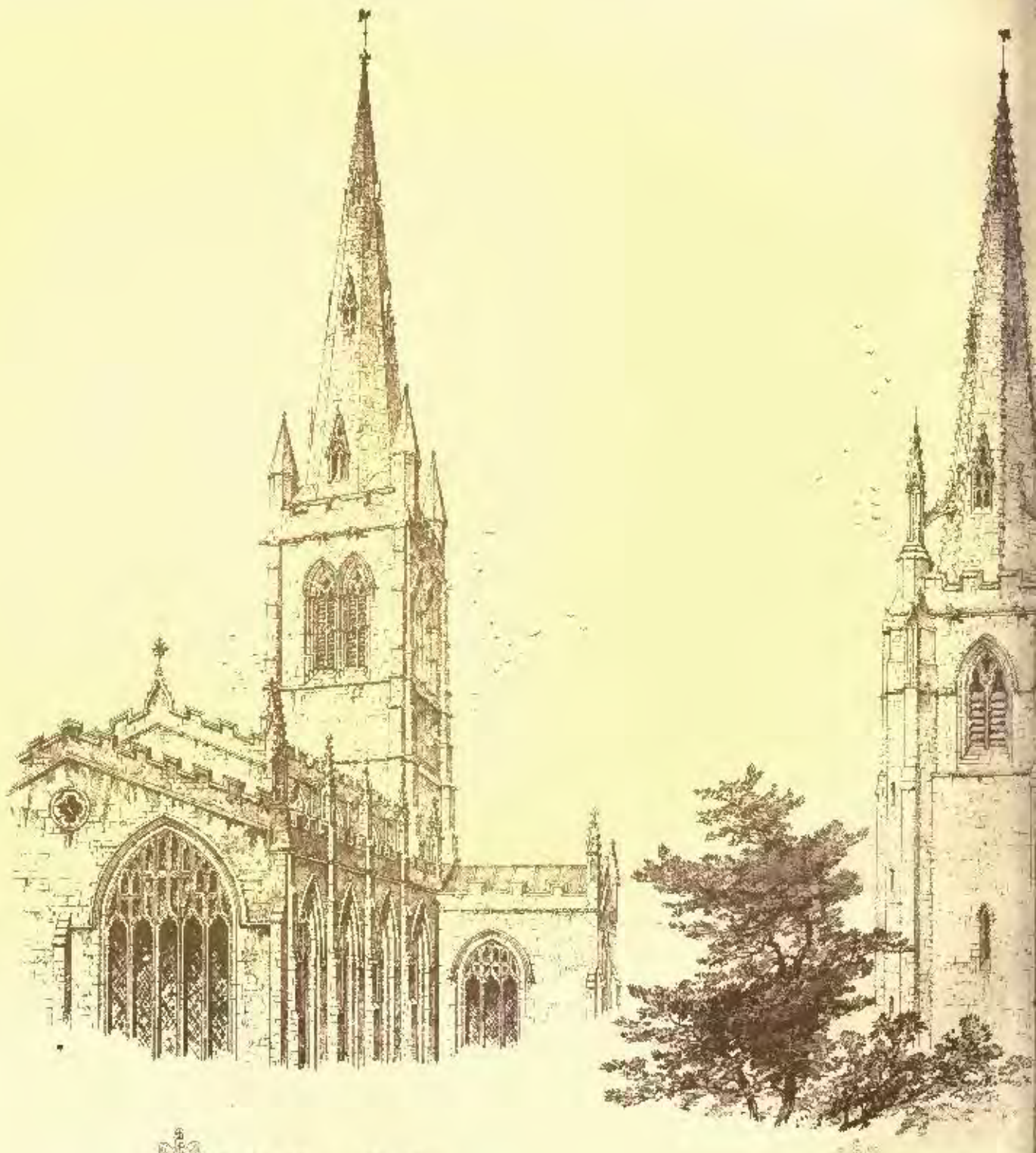
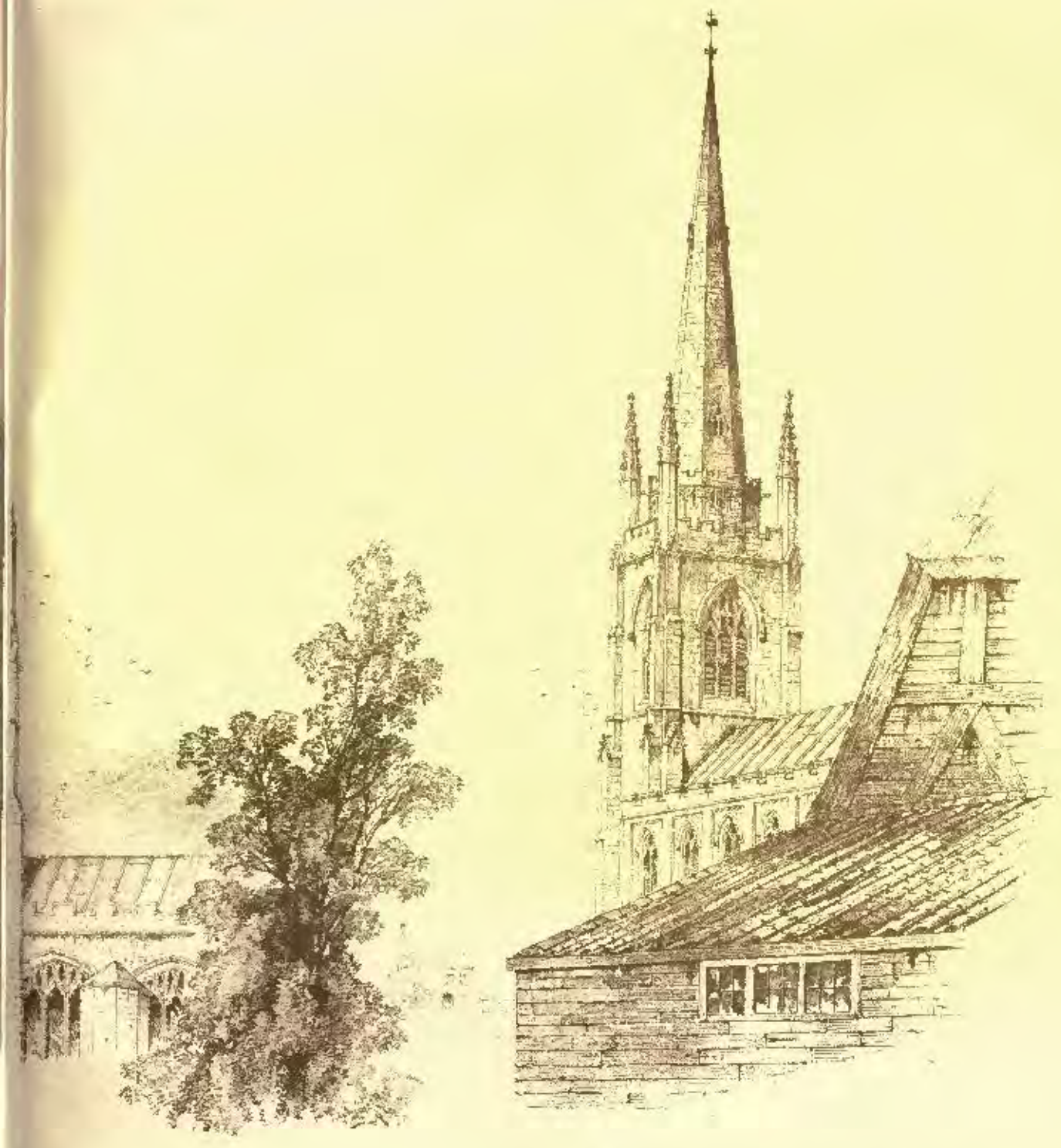


All Saints, Oakham.

Rutlandshire.

Saints Mar

Plate N° 43.



Nicholas, Spalding.

lashire.

Saint Mary's, Swineshead.

Lincolnshire.

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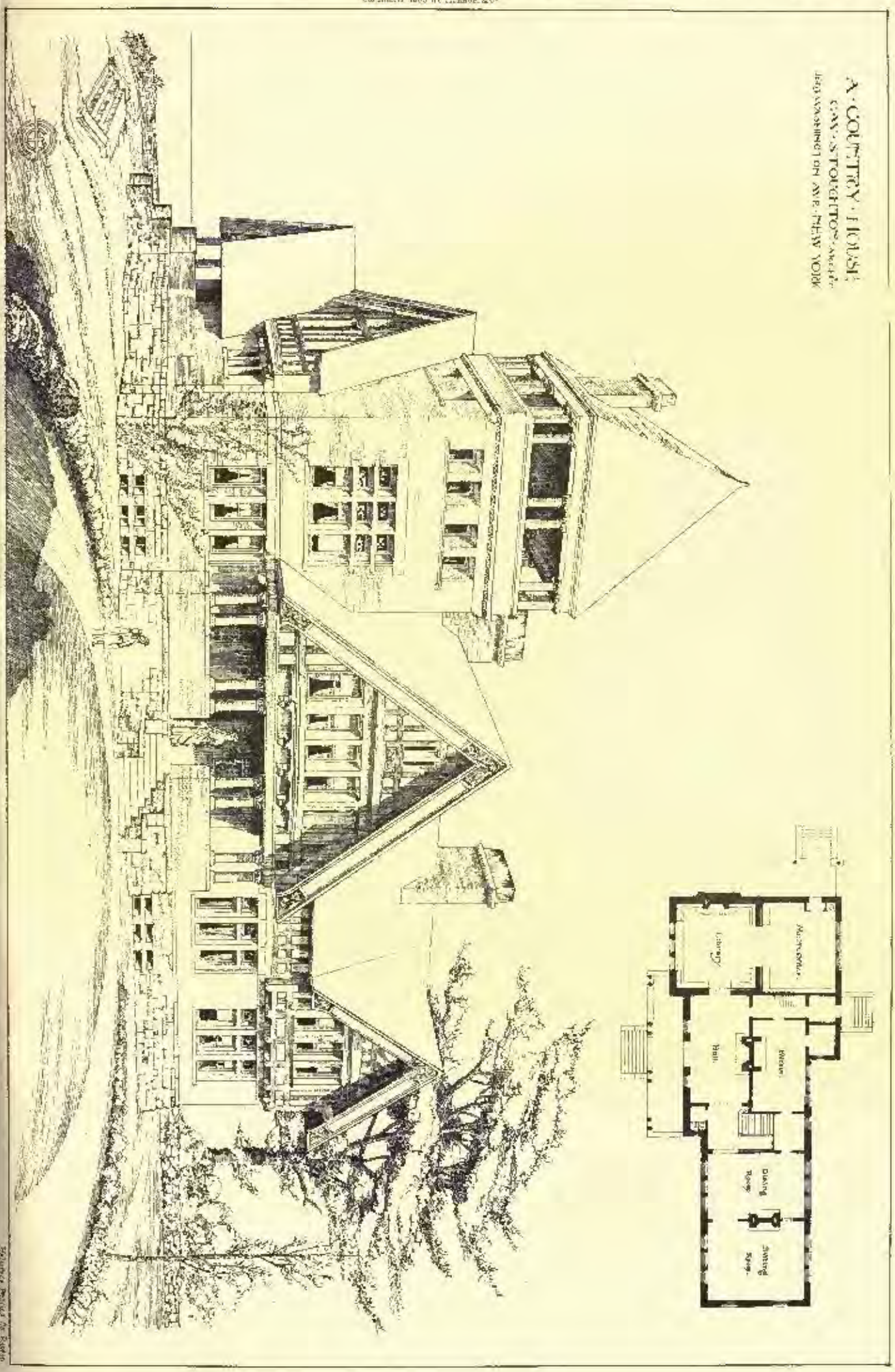
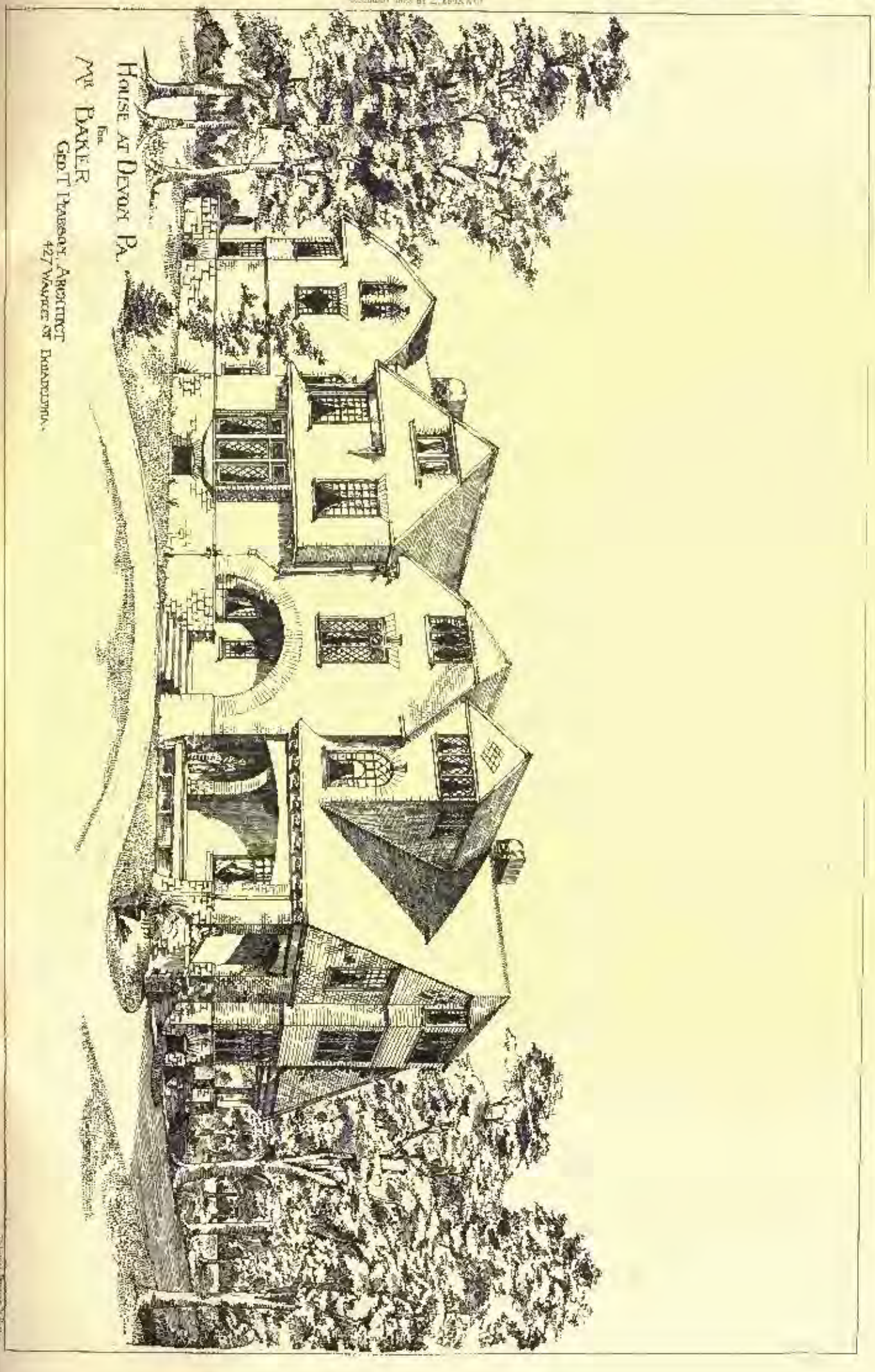
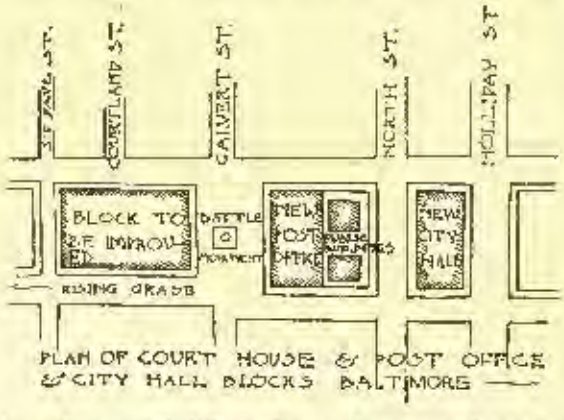



HOUSE AT DEVON PA.
FOR
MR BAKER
GEO. T. PEARSON, ARCHITECT
427 WALNUT ST. PHILADELPHIA.

was derived, and from the same source come the following items about real estate in Baltimore: "Sales have fallen off and prices ruled as low as in 1887, much of the depression is attributed to the absence of public spirit and want of economy in public affairs, absence of manufacturing and the large abatement of home capital — the number of new buildings (shows) a falling off of over 1,000, compared with 1887." The force of these remarks is somewhat modified by the fact that they proceed from a town to which many persons, agreeing with our esteemed contemporary *Life*, have not failed to attribute certain Rip-Van-Winkle characteristics; also by the fact that during the month in which they appeared, the grain exports of Baltimore are said to have exceeded those of New York and Philadelphia combined, a state of affairs so alarming, that an investigating committee was at once sent to see "what was the matter." It grieved them to discover that the facts were undeniable, and that nothing whatever was the matter.

Certain incongruities in the results to be expected from these data may be explained by the lack of any accurate definition of what the single dwelling-house really means, and by the careless interchange of the "multa" for the "multum." A Baltimore dwelling *may* house comfortably only a half-dozen people, a New York one a hundred or more, the one *may* cost a thousand dollars, the other a hundred thousand. The same comparison holds good for other cities, as illustrated by the fact that from one of the tables quoted above, under the head of number of existing dwellings in 1888, Philadelphia is represented by 146,412, and New York by only 76,684. Truly digits are doubtful, and if we may be permitted a not unclassical form of speech, although they may not absolutely lie about the truths they can get out of statistics, they rarely tell the whole truth about all that lies in them. Baltimore certainly continues to hold her own in her hackneyed reputation as the "city of homes," and in the increase of the small individual dwelling-house, tending, among those showing the hand of an architect, to grow even smaller than formerly; we have not, however, seen any of really satisfactory interior design, or indeed without decidedly objectionable features in the planning, where the width of the lot was less than sixteen or eighteen feet. As to the façades, on the other hand, here and there some intelligent and simple designs stand out conspicuously amid the vast amount of the ordinary builder's foolish conglomerations. Notably a group of quiet white marble fronts on Townsend Street near Charles, and from the same office there is a good bit of simple design, of brownstone and brick, in a single house on St. Paul Street, near the bridge, — barring the galvanized-iron frieze and cornice with details probably designed originally for stone.

Two items of City-hall news have lately excited more or less public interest and comment and give a certain insight into methods of municipal government. The block of ground in the very heart of the city, bounded by Calvert, Fayette, St. Paul and Lexington Streets has for many years been occupied over a large part of its



PLAN OF COURT HOUSE & POST OFFICE & CITY HALL BLOCKS BALTIMORE

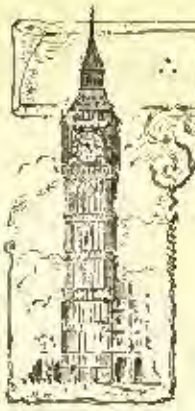
area by various court buildings, the most important of which are the old Court-house proper in brick, and of colonial design, and the very severe and massive looking granite Record Office, now old and in many respects inadequate to be sure, but, standing isolated within the same inclosure upon abruptly rising ground separated from each other by a wide open space, they are not without some claim to architectural merit, nor devoid, as a group, of a certain monumental effect and solidity, and the interest of local historic association. For any future improvement of this tract on an extensive scale a most excellent treatment is strongly suggested by the surroundings, rising westward as it does from Battle Monument Square to the east of which about the same area is almost entirely covered by the City-hall and the new Post-office, so that there is possible a very large and effective architectural scheme (in spite of details in the new buildings) extending over four blocks, east and west with the monument itself as a centre. If the plan to be adopted for the future improvement should be only additions and alterations to the old buildings, no less careful consideration and treatment would be required to obtain a harmonious and successful result.

For some years past various indefinite suggestions have been occasionally mentioned for this improvement, but the public were not aware of any actual steps being taken in the matter until a few weeks ago, when the following piece of news appeared in some of the daily papers, accompanied by a ghastly-looking sketch of the proposed building.

"Building Inspector J. Theodore Oster has completed designs for the new Court-house addition, for which $150,000 of the $5,000,000 loan is set aside, and will submit them to the City Council and the Supreme Bench this week. Mr. Oster has designed an ornate and commodious structure with all modern conveniences, and, it is claimed, with sufficient room to accommodate all the judicial machinery of Baltimore for half a century to come: a little architectural ornamentation will give the metamorphosed and re-created structure a handsome appearance. The designs completed by Mr. Oster have been much admired and will probably be adopted with little change." We will add to this the fact that, without questioning in any way Mr. Oster's ability as a building inspector, he has never been known in the community as an architect.

As soon as the matter became generally known and a subject of public comment, one of the more progressive and liberal-minded members of the City Council at once offered a resolution in that body to the effect — that a transaction of such importance to a city should be carried out only with the most careful consideration for the best practical results and architectural effects; that an unpaid commission of five citizens (naming them), well-known for their intelligence and public spirit, should be appointed to carefully consider the whole matter and be empowered to obtain preliminary sketches from architects, with a certain sum — ludicrously small — appropriated for that purpose. This resolution was simply "referred to the committee on ways and means." A numerously signed paper from conspicuous citizens, including nearly every architect in town, was also presented to the City Council, covering about the same ground, and protestating against summary proceedings in such an important matter. The mayor himself is said to have stated that what is proposed at the $150,000 would be at best a temporary and patched-up building, only partially fireproof, which could be erected in about a year, while the greater scheme for entirely new buildings would cost $2,500,000, and would require an enabling act from the legislature and several years for its completion. Having reached this stage the matter quietly went to sleep, or into secret session, and nothing has been heard of it for several weeks.

Another very recent transaction is also something of an illustration of methods of City Government. Upon one of the principal up-town avenues, a main thoroughfare, and one of the widest streets of the city, the property owners extending along two blocks had given an additional fifty feet of their lots to the width of the street, had had the central space curbed and plotted in parkings, and presented the whole to the city. This has became one of the most desirable and attractive locations for residences, and is being rapidly built up as such. A public livery stable firm desired to establish itself on one of the lots opposite this parking. An option, up to a certain date, was obtained on the property from the owner, and the required legal notice published in one of the least important of the daily papers. This being finally discovered, a general protest immediately arose, a hearing was given before the special committee to whom the matter was referred, when every property owner represented most emphatically and unanimously, with strong reasons opposed the permit, with one exception, and that was the man who was selling the property. A protest, signed by a large majority of property-holders in the immediate neighborhood was also sent to the City Council itself. In the face of this very general opposition, based upon the most self-evident grounds, the permit for the erection of the building was given, and the work upon it is now in progress, but the special influences, both direct and indirect, brought to bear upon those in authority in order to obtain the desired end, were not unknown, it is said, to those interested in the matter, and their own line of justifiable opposition was quite powerless against them.



LONDON

THE LAST ACT OF THE METROPOLITAN BOARD OF WORKS. — THE EXAMINATIONS. — THE ATTACK ON ST. MARY-LE-STRAND. — WALL PAPERS. — CONCRETE-FILLED WALLS. — LORD GRIMTHORPE AND ST. ALBAN'S ABBEY. — PETERBOROUGH CATHEDRAL. — FAMILY PEWS.

ONE would have thought that the recent troubles of the Metropolitan Board of Works would have been a strong incentive to them to pass the last few days of their chequered life in some sort of sober respectability, but it has been decreed otherwise. Bearing in mind the fact that it must dissolve and give place to the new London County Council on April 1, yet, on March 15, almost within a fortnight of its dissolution, in the face of the strongly expressed opinions of the President of the Local Government Board and the Chairman of the London County Council, it actually entered

into a contract for a tunnel under the Thames at Blackwall, costing some hundreds of thousands of pounds, and some fifty thousand pounds in excess of the official estimate. This reckless appropriation of public money, by a body whose life could be counted by days, was really scandalous and very exasperating to the public. Fortunately, the new Local Government Bill gives power to the Government to advance at its discretion the date at which the County Council comes into existence, and Mr. Ritchie, the President of the Local Government Board, has intimated that this extreme step will be taken, and the Board of Works summarily put out of existence before they can hold another meeting to finally seal the contract. If this be done[1], it will be a fitting end to a misspent life. The noble Chairman of the Board has been assuming a degree of hauteur and officialism, which would be mightily amusing were it not so very absurd considering the position in which the Board is placed.

There has been a good deal of discussion here lately upon the question of erecting a new monumental chapel as a sort of Campo Santo at Westminster Abbey. As you know, the hallowed area where our most illustrious dead rest from their labors, has, unfortunately, become full, and there is hardly a space remaining for fresh interments. A former First Commissioner of Works, Mr. Shaw-Lefevre, is one of the prime movers in the matter, and he published recently in the *Nineteenth Century* his ideas upon the question. This has provoked a storm of opposition, and various other schemes and projects have since been started. Public feeling is, however, very much against any interference with the Abbey, and, I think it very improbable that the idea will bear practical fruit. The most reasonable plan at present is to employ the existing cloisters for burial, for some time at least, and there is very little doubt that this will be the solution of the difficulty.

We are in the throes of another examination for the Associateship of the Royal Institute of British Architects. Between sixty and seventy students have presented themselves, so that the examination is the largest yet held. The new scheme of examination is now under discussion, and it will probably take a form similar to that now in vogue in the other learned professions, *i. e.*, preliminary, intermediate and final. The first of these is a simple schoolboys' examination, but the other two are professional; indeed, the final one will probably be very searching in its nature. Nothing is yet, however, quite definitely settled.

The *Daily Telegraph* continues its attacks on the Church of St. Mary-le-Strand, and a movement is being got up among the tradespeople in the neighborhood to agitate for the removal of the edifice, and, unfortunately, Mr. Augustus Harris and Captain Probyn, the representatives of the Strand Division on the County Council, have bid for popular support, and promised to vote for the destruction of the church. On the other hand, the Architectural Association has unanimously passed the following resolution, and ordered it to be sent to the County Council, the Strand District Board of Works and the Rector of the threatened church:

Resolved, That the Architectural Association views with great regret the agitation for the demolition of the Church of St. Mary-le-Strand, and desires to enter an earnest and emphatic protest against any such demolition, as being not only utterly uncalled for by the requirements of traffic, but also a wanton destruction of one of the finest examples of the work of that eminent architect, James Gibbs, forming with the buildings around it, one of the most beautiful and picturesque architectural groups in London.

The Royal Institute of British Architects has also taken up the question of the destruction of the Church of St. Mary-le-Strand, and I hope that this combined action of the two great professional societies in England may have some influence in getting the County Council to think twice before they commit such an act of vandalism as is proposed.

An extremely interesting paper was read the other night before the Architectural Association, by Mr. A. B. Pite, upon "Wall-papers," and the collection of specimens exhibited illustrated in a striking manner the great advance which popular taste has made during recent years. Perhaps one of the most noticeable features of quite the latest fashion is the immense size of the pattern, which is drawn in bold, flowing curves, and printed in two simple tints, without shading of any kind. Several of Mr. Heaton's masterpieces of design and manipulation were shown, and some were very ingenious and charming in effect, particularly the specimens upon which hand-stencilling had been called in to the assistance of the manufacturer.

A very successful visit of the Architectural Association took place on Saturday to the new Parish Church of St. Mary, Hornsey, which I may call one of Mr. James Brooks's most successful efforts. In the course of his explanation, Mr. Brooks stated that he had built the walls of two casings of stone and a filling of Portland cement concrete, in the proportions of seven to one. He claimed that by this method he had saved nearly £1,000 and made a stronger job, and it certainly seems to be a wrinkle worth thinking about.

Public attention has again been called by Lord Lamington in the House of Lords to the state of public buildings in London, but it has elicited nothing further than the usual official rejoinder that the Government has no funds at its disposal. The homeless condition of the National Portrait Gallery, a very valuable collection of portraits, ought to move to pity some of the stony-hearted keepers of the public purse, but it does not; and unless there is a fire, or some other extraordinary occurrence, this gallery will, it seems, have to do without a home. This is only a specimen of the contemptuous manner in which matters architectural are treated in the metropolis of England.

A most curious dispute is proceeding between Lord Grimthorpe, the quondam Sir Edmund Beckett, Q. C., author of a "*Book on Building*," and general self-appointed adviser to the profession generally, and Mr. Henry Hucks Gibbs, a rich city financier, as to who shall repair the Lady Chapel at St. Alban's Abbey. The noble lord, as you know, obtained a faculty some years ago for restoring the Abbey generally, and now wishes to make out that no other person may do anything to the building except himself. The sympathies of the profession are entirely with Mr. Gibbs, and to rescue any part of the once noble old abbey from the hands of a wealthy architectural charlatan like my Lord Grimthorpe would be a boon indeed.

While, however, these two amateur restorers are fighting over St. Alban's Abbey, the restorations at Peterborough Cathedral, which, you remember, were obliged to be done to save the building from ruin, have come to a complete standstill for want of funds. This is a great pity, for Peterborough is one of our *chefs d'œuvre*. Still, it is far better for the restorations to be carried on slowly, in a reverent and conservative spirit, than to be abandoned to the unhappy fate of St. Alban's.

An interesting decision was come to the other day upon the question of family pews. You know that here it is often the custom for single pews to remain in one family for generations, and so a sort of recognized right is, after a time, acquired over these pews. Now these constructions are mostly of a very curious character. Many are like a room, with curtains all round, carpeted and furnished with table and chairs, and what went on inside was more often prated of than seen. This sort of thing, though, does not suit the modern ascetic ecclesiastical clergyman, and the order has gone forth to clear away these old pews and substitute natty oak benches, and this has been the cause of much strife and heart-burning. At last the question has been brought before the higher courts, and the pew-owners have won the victory. The clergy are threatening to take the matter before the House of Lords, our final Court of Appeal, and it will be interesting to watch the case if this is done.

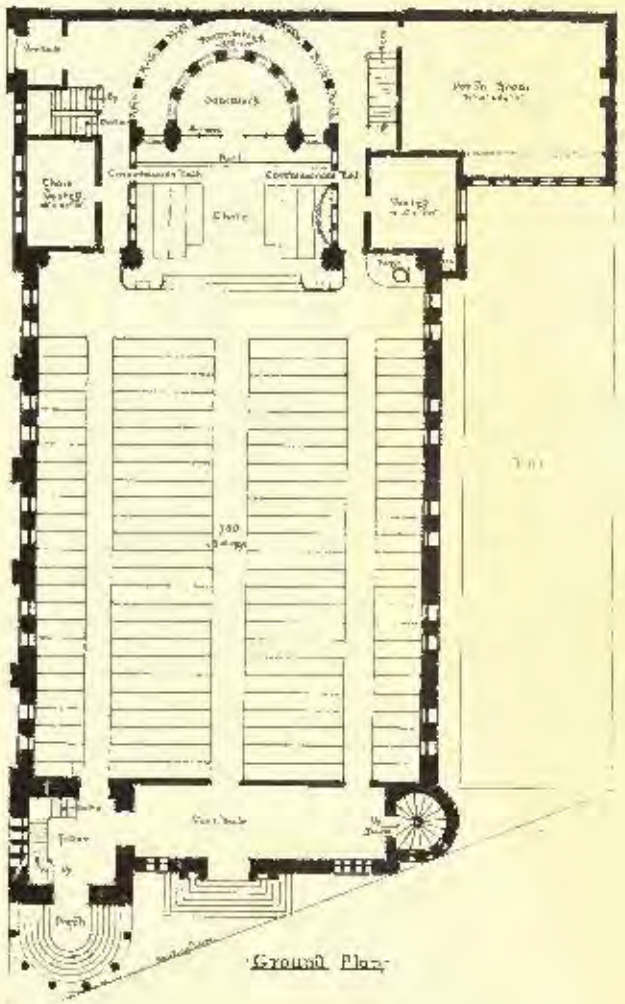
[1] *Later.*—The Metropolitan Board of Works is no more. The Provisional London County Council took the hint of the President of the Local Government Board, and made a formal application to the Government to determine the existence of the Board of Works on Thursday, the 21st inst., to prevent them sealing the contracts for the Blackwall Tunnel at their weekly Board meeting on the following day. Mr. Ritchie duly acceded to this request, and issued an edict to the required effect.

THE ONTARIO PROVINCIAL ASSOCIATION OF ARCHITECTS.—THE PROPOSED ROYAL VICTORIA HOSPITAL AT MONTREAL.—FORMATION OF OTHER ASSOCIATIONS.—THE SHIP-RAILWAY TO BE BUILT.

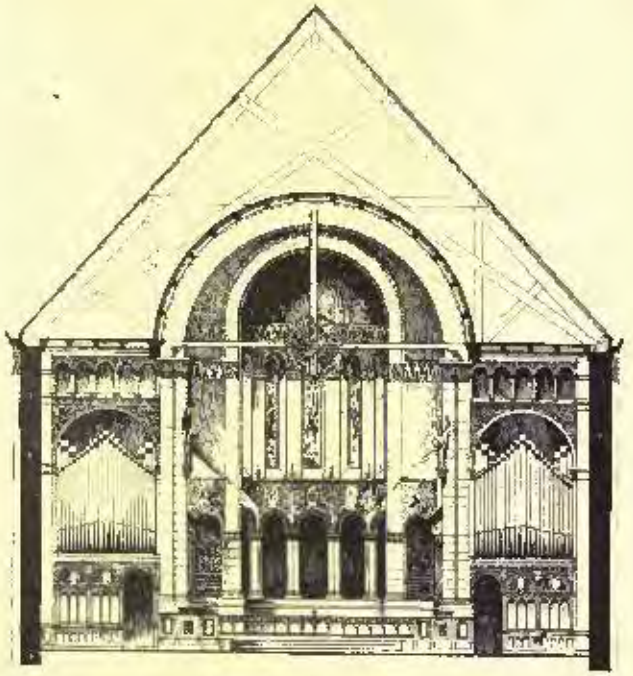
NOTHING could have been more satisfactory than the inauguration of the Ontario Provincial Association of Architects last month, and the original promoters of the scheme may be very heartily congratulated upon the ready and enthusiastic response made to their invitation from all places in the Province by architects anxious to uphold a movement so thoroughly well calculated to benefit not only the profession, but the public also.

An association of this kind, as was pointed out by the chairman of the meeting, has in no sense the objects of a trades-union or any similar body. By the combination of architects to uphold the dignity of the profession, which object is brought about in various ways and upon definite principles, the public are protected from the adventurous and fraudulent individuals who play upon the credulity of their innocence, and, because there is nothing to prevent them from calling themselves architects, "hang out their shingles" and gull the poor wretches who trust to their fine representations of themselves and their capabilities. "The dignity of the profession" has become to a great many, unhappily, a by-word and a joke, and none are more ready to laugh at the expression than those architects who care so little about their own reputations for professional honor that they will do anything to get hold of work, no matter how small a sum is to be expended upon it. Who would have thought it worth a man's while to draw away a client from a brother architect who was about to design a house to cost $2,500 by declaring that he could do it much better if the client would come to him. Yet that is an actual case. But such dealings as these the members of the Provincial Association rightly scorn. Any member being found guilty of such practice would meet with severe censure from the whole Association.

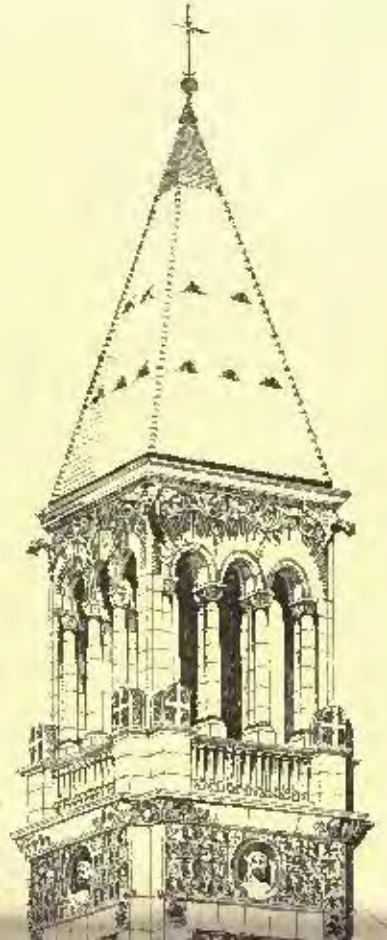
Under-charging one another is deprecated in the strongest manner, and perhaps this is the most important particular in professional ethics, and one which concerns the public most. If the public want reliable men to carry out their work they must pay the fair market-

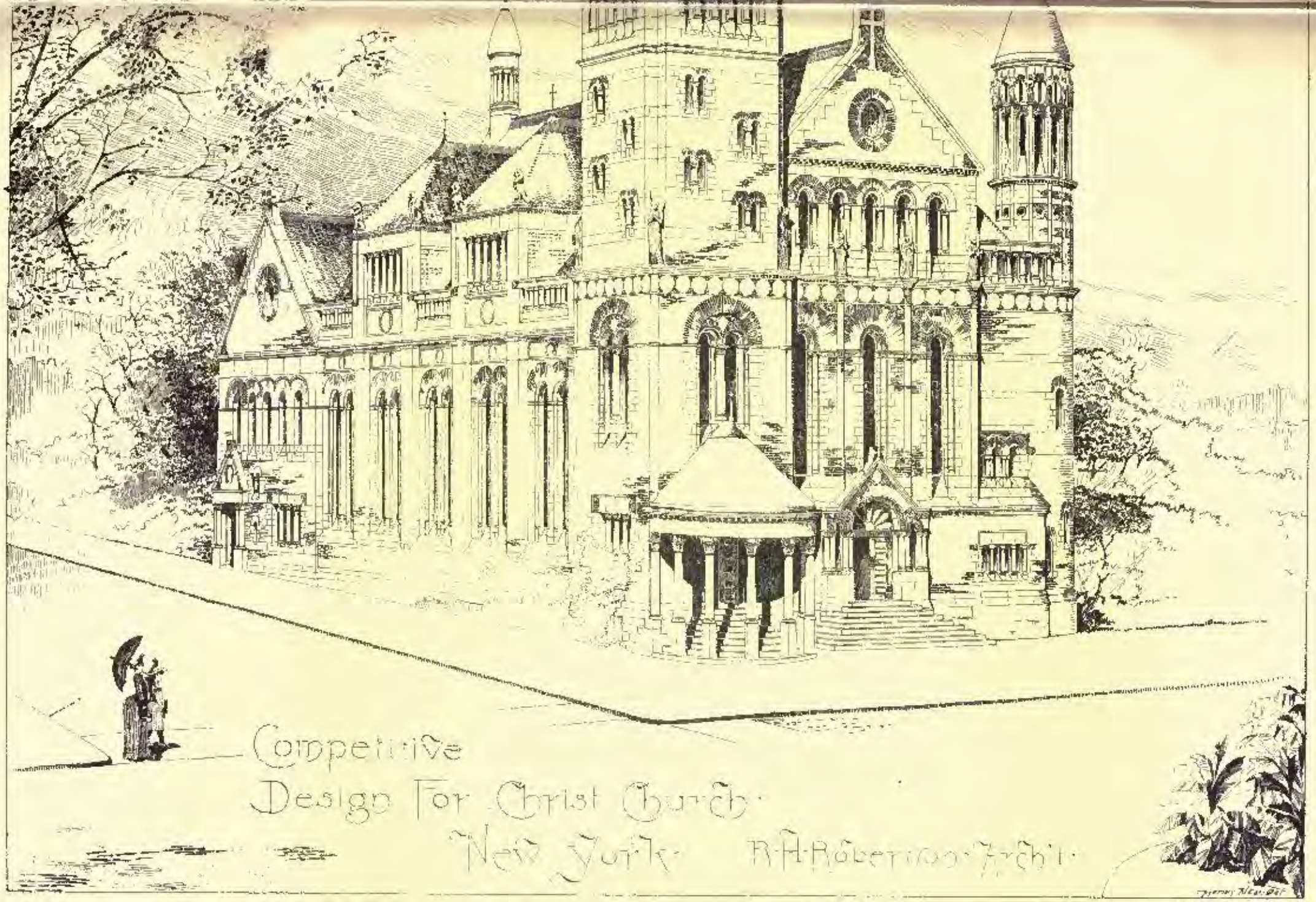


Ground Plan.



Cross Section.





Competitive
Design For Christ Church
New York R.H.Robertson Arch't.

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Heliotype Printing Co., Boston.

Helio-Chrome.

NEW YORK CENTRAL RAILROAD EMPLOYES' READING ROOM, MADISON AVENUE, NEW YORK, N. Y.

R. H. ROBERTSON, Architect.

price, and they must be taught that the advice and work supplied to them for a less figure than that authorized by a regular scale of charges is not to be relied upon. They are so ignorant that they only argue: So-and-so apparently got what he wanted, and only paid 1½ per cent for it; why should I pay you five per cent? They little know what a mere blind the 1½ per cent, and how, really, they have paid through the nose instead. The following is a good example of one kind of person architects have to deal with sometimes: On hearing that an architect would charge five per cent for a small house, the client remarked that he did not see why he should pay so much, as he understood that amount was the "highest figure ever charged," and he likened the case to that of certain doctors with whom he had lately something to do. He said that recently, when his wife had been confined, he had called in Dr. ——, who had charged him thirty dollars. "Why," says he, "if I had only called in Dr. So-and-so, he, for the same thing, would only have charged *ten dollars*." Perhaps it is needless to say the architect told him he had better take his "job" to a one-and-a-quarter-per-center without further delay.

One of the objects of the Association is to obtain incorporation, and legislation will be sought early with that object in view.

The meeting which was held in the Queen's Hotel, Toronto, numbered some seventy men. The Architectural Guild of Toronto, the original promoters of the scheme, and the representatives of the profession in that city were there in force. Deputations came from Ottawa, Peterborough, Kingston, Hamilton, London, and other places, all of whom, having received copies of the draft Constitution and By-Laws, came prepared to discuss them, and ready with resolutions for their improvement. This had the effect of greatly simplifying the business before the meeting. Mr. Charles Durand, of London, Ontario, was voted to the chair, and he exhibited splendid qualifications for the post. The manner in which he conducted the meeting was deserving of all praise, and, owing to his tact and businesslike management, the meeting was one of the most orderly of its kind that has ever been held. Mr. Langton, of Toronto, acted as Secretary, and to him is due great praise for his indefatigable efforts in bringing about the formation of the Association, together with his colleagues in Committee, who assigned to him the arduous duties of Secretary to the Committee. The professional press was represented by the *Canadian Architect and Builder*, which paper, in the course of the proceedings, was formally declared to be the official organ of the Association.

A good, steady afternoon's work disposed of the Constitution and By-Laws to the satisfaction of all interested, and perhaps not the least subject of satisfaction was the fact that certain men found the objects and sense of the meeting militate against their ideas of the conduct of their business, and disposed of themselves by quietly slipping out, but not, as they hoped, unobserved.

The Directorate of the Association was made as representative as possible, and the following was the unanimous result of the voting on nominations made by a special committee struck at the meeting for that purpose: President, Mr. Storm, of Toronto; First Vice-President, Mr. Arnoldi, of Ottawa; Second Vice-President, Mr. Durand, of London; Third Vice-President, Mr. Balfour, of Hamilton; Directors: Mr. Belcher, of Peterborough; Mr. Burke, of Toronto; Mr. Power, of Kingston; Mr. Mulligan, of Hamilton; Mr. Curry, of Toronto; Treasurer, D. B. Dick, of Toronto; Secretary, S. H. Townsend, of Toronto.

The first annual meeting of the Association is to take place on the third Wednesday of November next, in Toronto.

The Architectural Guild of Toronto invited all the visiting architects, as well as the rest of the architects of Toronto, to dine with them at the Queen's in the evening, and they there sat down, to the number of about sixty, and passed a very pleasant and interesting evening together. Mr. David B. Dick, of Toronto, one of the executive officers of the Guild, took the chair, and at his right hand sat Professor Galbraith of the School of Practical Science, one of the guests who, though not architects, were all much interested in the movement. The Secretary of the Guild read numerous letters from other invited guests who, through previous engagements, were unable to attend, all expressing their sympathy with the objects of the Association. Among these were the Hon. G. W. Ross, Minister of Education, Sir Daniel Wilson, head of the University of Toronto, and the Mayor of Toronto. Speeches followed the dinner on the objects of the Association, the professional training of students, the practical and theoretical sides of the profession, and these were interspersed with songs. Mr. Rastrick, of Hamilton, an aged but worthy member of the profession, formerly a pupil of Sir Charles Barry, and an F. R. I. B. A., told how hard pupils had to work in his days of study — when, in Sir Charles Barry's office, he had to be at his place at seven in the morning, and remain there until eight at night. Many toasts were proposed and heartily responded to, and the guests thanked the Guild very cordially for the sumptuous manner in which they had been entertained, and so ended a day long to be remembered in the annals of the profession in Canada.

Apropos of this subject, I may mention that the Minister of Education has just issued and circulated among those interested his report on the subject of "Technical Education." The Hon. G. W. Ross gives an account of his visit of inspection to the Cornell and Lehigh Universities, Columbia College, the Stevens Institute, Hoboken, and the Massachusetts Institute of Technology, detailing the systems of education and courses of study, giving descriptions of the buildings and the sums expended upon them, and closing his report with an account of the Ontario School of Practical Science, in which he desires to found a chair of architecture; and a report of the meeting he convened last December to ascertain the feelings of representative men, with reference to the establishment of classes for applied chemistry, applied mechanics and architecture.

The Mayor of Montreal has received from Mr. Saxon Snell the plans for the proposed great Royal Victoria Hospital, in that city, the free gift of Sir George Stephens, Bart. and Sir Donald Smith, Knt., a short description of the general arrangements may be of interest: it is a very large group of buildings estimated to cost $550,000, giving accommodation to 348 patients, at a cost of $1,600 per bed. The general plan consists of a central group of four buildings — the nurses' apartments; the clinical department; a building with operating theatres and mortuary, and an ice-house. On each side of the central block are buildings connected with the central block, and with each other by galleries at each floor level; on the left, three buildings, and on the right, two, each four stories high. Staircases connecting the different floors are all outside the building, thus severing connection between the wards themselves. Accommodation is provided for surgical patients, 90 beds; for medical, 180; for private paying patients, 20 beds, and for infectious cases, 35 beds. Verandas are attached to every ward, and all the arrangements are of the very best order. In securing the services of Mr. Saxon Snell whose "forte" is hospitals, the city has taken the wisest possible course, and they will have a hospital than which no finer exists in the world. Particular attention has been paid to the infectious-diseases department: it is situated at a considerable distance from the rest of the buildings, and is constructed on the hut system, divided into three sections for the separate treatment of every kind of disease, and in connection with it are provided rooms for the staff of nurses and doctors and attendants specially devoted to the work of this department.

At the time of writing, Montreal is not yet out of the winter, the ice in the river shows signs of breaking-up, while in Toronto the ice has been gone a week. With the break-up of the ice at Montreal, the inhabitants are on the lookout for floods, through which season they have to pass before they can comfortably settle down to enjoy the spring; but this year they are cheered with the probability of getting it all over early. Navigation opens very irregularly — any day, in fact, between the 30th of March and the 20th of April. An early break-up means a good year for building, for the earlier the frost comes out of the ground, the earlier the new bricks are made — usually it is no joke having to wait till the 15th of June, the day new bricks are ordinarily ready.

The 1st of May, the great day for moving in Montreal, is looming on the horizon, and instigating owners of houses and office-blocks, to use their utmost endeavors to get their unfinished buildings ready for occupation by that day.

A great block for a dry-goods firm, to cost $150,000, has recently been competed for by architects in Montreal. On receipt of the designs (of which there were 10 in number sent in), the owners of the property made a very prompt decision, and returned the other designs without delay. It does not appear that the owners were assisted by any professional referee; but, then, in Montreal they do not understand that kind of thing, and the architects who will not enter into association have to put up with ignominious treatment and take their chances, and then howl at results which are partly their own fault.

Ottawa has established an "Institute of Architects," with Mr. Fuller, the Government Architect, at its head as President; and Hamilton architects have also associated, giving the Presidency to Mr. Rastrick, the "father of that profession," in that town. Both these associations are the outcome of the Toronto Guild's movement, and they are formed with the same objects, in the interest of the profession in each place.

Contractors and master-builders all over the Province of Ontario are agitating with the object of forming an association. Associations seem to be the order-of-the-day, and we may look forward to seeing a very satisfactory state of things before long. Associations of architects, of builders and of workmen, all united in a sort of mutual understanding, and able to meet upon definite and understood grounds for the settlement of all matters of dispute, and for the regulation of the building trades generally.

After closing my letter, I open it to add a postscript on a subject of interest. I see that the projected ship-railway, across the isthmus of Chignecto, Canada, is actually to be commenced. Its object is to save between 500 and 600 miles of sea voyage round Nova Scotia, and small vessels will be enabled to go direct from Chicago *via* the lakes and St. Lawrence River, over the isthmus, and so down to Boston, without the necessity of transhipping their cargoes to more seaworthy vessels. The isthmus now separates the St. Lawrence from the Bay of Fundy. It was first proposed to make a canal, but the cost of $12,000,000 (twelve million dollars), just double what the railway will cost, caused it to be abandoned. Mr. Henry Ketchum is the prime mover in the scheme, and has recently succeeded in placing preference shares on the London market. Messrs. Dawson, Simenes & Usher have the contract. Docks are to be provided at each end, and the vessels to be transported will be raised and lowered on cradles by hydraulic lifts. Locomotives will draw the trucks on which the vessels are placed, which may be loaded up to 1,000 tons burden.

EQUESTRIAN MONUMENTS.[1] — XIV.

THE CONDOTTIERI.

An Old Florentine Cut.

Of the ancient Athenians, Dion Chrysostomus, the golden-mouthed, once said that they used to bestow statues in the same spirit that toys are given to children; that is, in the perfect assurance that sooner or later, for one reason or another, they would be broken and cast aside in favor of newer playthings. This seems to imply that his observation showed that political feeling or the partisans of new and rising sculptors, even in comparatively quiet times, swept out of sight statues of men who had had their day in popular favor. The same remark would probably hold good in all times, but in none more than in the early Renaissance, in those turbulent times when violence and culture travelled in company from one end of Italy to the other, and left their so dissimilar traces everywhere. Sack and rapine make wanton waste, and it may well have been that, besides the famous equestrian statues that survive from that time, others perhaps no less worthy have disappeared and left no trace.

Many well-read men who are perfectly familiar with the names and deeds of the men who made the history of England and France are largely innocent of a similar knowledge of the great names that are sprinkled over the brilliant pages of the history of Italy. In our youth we are taught with infinite particularity the history of ancient Rome, and are even hurried through the tale of the decline of the Roman Empire, so that in later life now and then a name is encountered which has a familiar sound, but not the good, wholesome ring which attends memory's vibrations when one of the grand names of the Classic epoch is encountered. What happened in Italy between the dissipation of the Western Empire and the dawning glories of the early Renaissance few know or care to inquire. We are content to pass over as of too little interest four or five centuries of a people's existence without taking the trouble to inquire what was going on politically, commercially or educationally. To a certain extent chaos reigned for centuries, and the strong hand had to keep each man's head and hearthstone. Armed struggle with domestic and foreign foe was the order of the day, and all cohesion as a nation came to an end — a bourn which was well marked by the disappearance of a common language, as Latin ceased to be spoken about 580, and dialects began to be commonly used. Little chance had the arts of peace in those times, when German hordes poured over the Alps on the one hand, and the Saracens invaded the land on the other. Records are few and imperfect, save in the matter of Papal history, and people are generally willing to take on faith the long chain of slight events that finally restored order, and the superficial student of the history of art is quite ready to pass from the glories of the Empire to the equal glories of the full Renaissance. But even here, though the word and what it stands for is a common household-word, few know what a fascinating field of study the history of the time of the Italian Renaissance really is. There are a few names that are familiar enough — the Medici, the Visconti, the Scalas, and the Doge of Venice as a *genus* are commonly known to readers, and to artists and architects there are other names as familiar, while the traveller's ear recognizes others from their association with the titles of palaces and other buildings he has recently confronted; but the names and deeds of others who play not insignificant parts are quite unknown to most. It is not possible here to give even a sketch of the history of Italy, but, as it is necessary to consider next a series of monuments erected to the honor of men who played brilliant rôles in one of the most stirring of historic periods, it is worth while to try to give some idea of the magnificence of the setting of the scenes amid which these men played out their brief parts.

These splendid pieces of architecture that we accept without inquiry as to the manner of life led by the builders were the result of a great but slowly-developed commercial prosperity[2], which had been largely the direct outcome of the founding of the free cities, by which the rights of the majority were protected, and the great body of the people became a nation of traders. The great families in various ways still managed to secure a lion's share, either by directly engaging in trade, or by success in the never-ending series of petty wars which, even in the most commercially prosperous times, were carried on here or there almost without cessation. The wealth that was thus gathered into the possession of a single noble was absolutely fabulous, and while the nobles of England, France and Germany had to content themselves with bare walls, rush-strewn floors, ungarnished tables and simple fare, the Italian princes of the same period revelled in a luxury of surroundings and furnishings which even these days could hardly match. Thus we read that when the Duke of Clarence, a brother of the Black Prince, was married to a daughter of the Visconti, her marriage portion being five cities and 200,000 gold florins, her father, Galeazzo Visconti, gave a banquet to the two hundred English knights who had accompanied the Duke, and before each course high-born attendants brought in and presented to each guest a valuable gift: "At one time it was a matter of sixty most beautiful horses with trappings of silk and silver; at another plate, hawks, hounds, horse-gear, fine cuirasses, suits of armor fashioned of wrought-steel, helmets adorned with crests, surcoats embroidered with pearls, belts, precious jewels set in gold, and great quantities of cloth of gold and crimson stuff for making raiment. Such was the profusion of this banquet, that the remains taken from the table were enough and to spare for 10,000 men." And a similar feast was held shortly after in honor of the marriage of his son Gian to Isabella of France.

These were curious times, when it was quite in keeping for such a man as Sigismondo Pandolfo Malatesta, whose family nickname — "Evil head" — fitted him better than it did some others of his race, to kill three wives in quick succession, violate his own daughter, and attempt the chastity of his son as mere incidents in his animal career, while he satisfied the demands of his higher nature by building the Church of San Francisco at Milan, or held long discussions on philosophy and arts and letters with the learned men he had drawn to his court; while Gian Galeazzo Visconti, who killed his own uncle that he might rule undisputed, built the Certosa at Pavia and the Cathedral at Milan.

It was a singular epoch, an age of tyrants — not successive, but many contemporaneous; an age of warfare, of love, of passion and intrigue ending in sudden and violent death; an age of distrust and self-seeking, when the dagger and the subtle poison accomplished what the sword openly unsheathed could not. It was an age of barbarism and yet of magnificence, for, though the leaders were constantly in a state of agitation, there were now and then short periods when a less turbulent prince held the succession, and then the practisers of peaceful vocations had their day, and gathered wealth at every hand, for through it all the greater number of the people clung to peaceful pursuits. So the life of the times was everywhere manysided, and it was possible for the tyrant, at length sated with conquest, revenge and bloodshed, to seek and find close at hand a society highly cultured in the arts and graces of a rapidly growing civilization. The great cities of the North grew and expanded as fast as these coarser tyrants, like Ezzelino da Romano, were extirpated. This man, had he lived in Classic times, would have to-day with all men a reputation which would put Nero's to the blush, for he had none of Nero's virtues. He was simply callous to all human instincts; his one pleasure was to wring a human being with tortures ineffable. His blood-thirstiness was his one all-absorbing vice; it left no room for passions of more human kind. In Padua alone he had eight prisons, holding more than ten thousand victims, and in them the arm of the executioner had no rest, and it was plied nightly in the presence of this monstrous tyrant, one of whose most atrocious acts was his treatment of the inhabitants of Friola, whom, without regard to age or sex, he put beyond the pale of future usefulness by putting out their eyes, and cutting off their noses, arms and legs. The mutilation of his victims was one of his most ordinary practices, and it was at that time the habit of the beggars throughout Italy to excite sympathy by attributing their real or fictitious infirmities to the cruelty of the Veronese tyrant. The death of this monster was typical of his life; overcome at length by a powerful combination formed against him, defeated in battle, and captured sorely wounded, he undid the dressings of his wounds and tore them open, so that he might escape the doom his victors had in store for him.

It seems incredible that during the constant struggles known by name, at least, to all as the wars of the Guelphs and Ghibellines, which lasted nearly four hundred years, and embroiled Southern Germany and nearly all of Italy, that the arts of peace should have made any headway at all, and it is very doubtful if they would if it had not been for the ingenious idea of Frederick II, grandson of Barbarossa, and the last emperor who undertook to govern Italy in person. Being also King of Naples, and being thus brought in contact with the Saracens who had maintained a footing in Naples and Sicily, he conceived the idea of employing them as mercenaries, that is, armed foreigners who, having no ties which connect them with the interests of the people amongst whom they may be placed, may be counted on to execute the orders of their paymaster, no matter what be the moral bearings of the orders imposed. This chance inspiration, and the establishment at Nocera of a colony of Saracen mercenaries, revolutionized the system of warfare in Italy, and made it possible for civilization and chaos to advance hand-in-hand over Italy. From this time [about 1225] onward warfare was carried on mainly by mercenaries, sometimes German or English or Swiss, or Gascon, Breton, Hungarian, or whoever finding life at home too dull cared to take up the adventurous life of the free lance.

These mercenaries, who in English history are known as free lances, or free companions, are in Italian history known as *condottieri*, and played an important part in the fourteenth and fifteenth centuries not only as subsidiary figures, but because not a few of their leaders by force of character, and by taking advantage of their opportunities, rose to positions of great power, and not only temporarily became the rulers of towns and provinces, but succeeded in founding families which were enabled to maintain the titles and powers that had been seized by their plebeian ancestor, and many a noble Italian to-day is as proud of his descent from some rascally foreign freebooter, as English families are of their descent from some man-at-arms who "came over" with the Conqueror.

John Hawkwood, or Giovanni Acuto as he stands in Italian annals,

[1] Continued from No. 691, page 173.

[2] In 1288 there were in Milan, which numbered 200,000 inhabitants, 13,000 private houses, 600 notaries, 200 physicians, 80 schoolmasters, and 50 copyists or writers.

was one of these *condottieri* to whom English romancers, at least, have given a most satisfactory character for unblemished honesty and manly virtue. He is pictured as one of those rough diamonds who, while first of all a soldier, still preserved amid the temptations of a roving life many of the kindly simple virtues of the typical knight. This character was probably not ill-deserved, and he was held in such esteem in his temporarily adopted country that, although he was not honored by the erection of an equestrian monument, the walls of the Cathedral of Santa Maria del Fiore, at Florence, bear a large mural fresco of the doughty Englishman painted by Paolo Uccello. Born in the County of Essex of ignoble parents and bred a tailor, he early abandoned the needle and shears for a nobler cutting instrument, and served under Edward III in the wars in France, and was knighted by the King himself. After the disbanding of the army, Hawkwood joined one of the roving bands of freebooters or White Companions, and entered the service of the Marquis of Montferrat. In the war between Pisa and Florence, he appears as commander of the Pisan forces, and for the next thirty years he was the leading *condottiere* of his time, serving now the Visconti, now Pope Gregory XI. and at last the Republic of Florence to whom he devoted the last part of his life with such faithfulness that at his death, he was decreed a public funeral and a monument — perhaps merely the mural decoration above mentioned — was erected in his honor. Evidently Giovanni Acuto was not the hero of the legend which relates that a certain northern city, vexed from boredom by visitors by a brazen *condottiere*, was in consequence overwhelmed with raptures gratitude toward its deliverer. Nothing within the gift of the city seemed to promise an adequate expression of the honor that ought to be bestowed, and day after day the wisest counsellors of the city sate in vain debate as to what the meed should be. At length a veritable inspiration seized one of them, and he cried out: "Let us kill him, and then worship him as our patron saint." All agreed that the solution was found, and we may fancy with what pagan festivities the unfortunate savior of the city was inducted into immortality. Those who know how common a thing it was for a hired leader who had done such a service to a beleaguered city to take advantage of the upheaval to seize the reins of government for his own use and profit, may suspect that the inspired counsellor was a practical joker of rather a grim sort.

John Hawkwood. Painted by Paolo Uccello, S. Maria del Fiore, Florence.

Tolentino. Painted by Andrea del Castagno. S. Maria del Fiore, Florence.

Hallam says: "The name of Sir John Hawkwood is worthy to be remembered as that of the first distinguished commander who had appeared in Europe since the destruction of the Roman Empire. . . . Every contemporary Italian historian speaks with admiration of his skilful tactics in battle, his stratagems, his well-conducted retreats. . . . Hawkwood was not only the greatest, but the last of the foreign *condottieri*, or captains of mercenary bands."

The Cathedral at Florence contains a companion painting of another *condottiere* of a later day, Niccolo Mauruzzo da Tolentino, who, captured by the Milanese, died in captivity in 1434, but the grateful Republic esteemed him no less worthy than Hawkwood of an equestrian portrait, and caused one to be painted by Andrea del Castagno.

The monumental portrait of Hawkwood is interesting, because he is shown in the half-civic garb probably worn on occasions of state, rather than in the full armor of the military commander of the period; the painter by this selection throwing away one of those factitious aids which add so much to the interest we moderns feel in the statues of the full-armored knight. There are no more popular "sights" in Europe than the great galleries of armor at Madrid, Paris, London, Berlin and elsewhere, and next perhaps to the pleasure that one feels in examining the stuffed figures of knights and horses in full armor, to be found in these galleries, must be counted the pleasure of looking at an armored statute simply because the figure is shown as clad in metal, and not in stuffs.

Weever's "*Ancient Funeral Monuments*," (issued 1631) says, speaking of Hawkwood, "The Italian writers, both Historians and Poets, resound his worthie acts with full mouth. But for my part (to use M. Camden's words) it may suffice to adde unto the rest these foure verses of Julius Feroldus:

> "The glorie prime of Englishmen, then of Italians bold,
> O Hawkwood, and by Italie a sure defensive hold;
> Thy vertue Florence honored worthie with, costly Grave,
> And Jovius admires the same now with a Statue brave."

Hawkwood's Descent. — Hawkwood's name was twisted by the Italians into Acuto, Acuto and Aguto, and one Italian historian speaks of him as Giovanni della Gruglia, or "doctor of the needle." By an error on the part of an English writer, who translated "Acuto," the Latin form of his name (in the superlative) as "Sharp" he has frequently been called, John Sharp. Bernard Becher, who writes of Hawkwood in "*Abbreviations Longa*," and calls him "the type of the free-lance," suggests that this blunder probably explains the wrong short duration of the candle, the minutes seen, and so forth. The fact that the name of Hawkwood has form of existence since the days of King John, throws a shade upon the humble lives of his origin. Nevertheless, "his name has been put to an absurd task, professing to tell, under the title of *The History of the Progress and Undoubted Heroick Atchievements of Sir John Hawkwood, Knight*, containing his many rare and exploits, military Exploits, heroick Atchievements, and noble performances, etc." Whether he was ever a tailor or not, it is certain that the Merchant Taylors' Company of London (which was licensed by Edward I), counts him as one of their most renowned members.

Paolo di Dono, called Paolo Uccello, from his love of painting birds, was born at Florence in 1397, and in early years was apprenticed to Lorenzo Ghiberti. It is doubtful if he ever left Florence, or if so, without including the study of perspective for which he became noted, although it is known that Masaccio taught him geometry. When young he painted many of the Florentine churches, and his frescoes in the Cloister of Santa Maria Novella — "Noah's Ark," "The Deluge," "Noah's Sacrifice," and "The Drunkenness of Noah" — are especially interesting. Vasari says that he painted so many of the birds and animals "that in Lombardy there were hardly their equals." He executed four other frescoes for the Cloister, and also a series of subjects of the Life of Christ, another series in the Cloister of Santa Maria Novella, and a St. Sylvester and the Resuscitated Bull for the Church of the Carmine. The latter also painted a series of portraits of Dante, Petrarch, Boccaccio, Giotto, Filippo Villani, Cimabue, Arnolfo di Lapo, and himself, for the ornamentation of the Cathedral, and executed many other works, including the "Battle of Romano," "Adam and Eve," and "The Annunciation," now in the Uffizi Gallery. Among the pictures ascribed to him are "The Hunt by Night," in the collection of Sir Charles Eastlake, and "The Battle of the Standard," in the collection of Mr. Fuller Maitland. Paolo was also a mosaic worker, and executed the mosaic of the Annunciation over the principal door of the Church of San Marco, Venice. He died in 1479, and was buried in the Church of Santa Maria Novella. Vasari says that Paolo was "a man of very singular character, who took delight in nothing but in those arts and in the difficulties of perspective, which, though very beautiful, are so full of intricacies that if the author himself wishes to extricate himself from them, he finds himself involved in labyrinths from which he cannot escape." Ruskin says: "Paolo Uccello, the first of the Florentine painters who gave himself entirely to the study of perspective, and who, in his pursuit of it, lost the greater part of the power he might otherwise have attained."

NOTES AND CLIPPINGS

The Explosion of Steam Boilers. — The [illegible] explosion of boilers the [illegible] explosions [illegible] another explosion of the kind [illegible] fear will not [illegible] explosions [illegible] engineers and [illegible]

The Coroner's verdict in Hartford concludes that the boiler would not have exploded if the safety-valve had not been fastened down, and assumes, with no direct proof, that the valve was locked to avoid disturbing the guests, as it had done once or twice by blowing off steam. This deduction is based on the fact that the boiler would have stood 205 pounds to the square inch, while the safety valve was at seventy-five pounds. It is significant, however, that where the rupture occurred there was "no thinning or deterioration; that the break passed through the plates without reference to the seams," that the bottom of the boiler was laid out flat and every tube torn out at both ends. "There was no evidence of local weakness of any kind, nor of low water nor of defects of construction."

In spite of the not unnatural suggestion that the safety-valve was locked, we mistake greatly if the facts do not cause the Hartford explosion to be ranked with a number in which there is plainly some force at work in addition to the steady expansion of steam until the limit of strength in the boiler is passed. Prof. Robert H. Thurston, in a paper read before the Franklin Institute five years ago, pointed out that this force might be furnished by the sudden conversion into steam of superheated water in the boiler by the liberation of a part of the steam by a small rent, a whistle or some like cause. Such an explosion in an experiment made by Mr. H. F. Stevens in 1871 blew up a boiler some time before its tested strength was reached. This force is certain to be most destructive in the ordinary shell boiler, which holds a large amount of water in a single mass, as the Hartford boiler did, ready when the right

conditions come to explode with a force far greater than gunpowder. This theory explains the destructive effect of boiler explosions like that of the "Westfield," which took place with only twenty-five pounds of pressure just as the whistle was sounded. It may give the cause for the recent Pittsburgh explosion, which came just as the whistle was sounded and the steam turned off for an hour given to a meal. The natural moral of this explanation is that "sectional" boilers, in which the water is divided up in smaller masses, ought, as far as possible, to be used in buildings where an explosion will cause great risk to life. At the same time the "easy" boiler offers no greater risk where care is taken. When one reflects that the United States has 7,500,000 horse-power scattered among 100,000 to 150,000 stationary boilers, and that in 1887, the last year reported, only 184 of these exploded, 40 per cent in sawmills, the risk is seen to be small. The Pittsburgh explosion recalls the explosion at Friedenshutte, July 25, 1887, when eighteen boilers in a "battery" of twenty-two exploded at midnight, killing twelve and wounding thirty persons. A prolonged inquiry into this disaster, conducted with the usual painstaking care of the Prussian service, failed to make the cause clear, and the conclusion reached was that it was probably due to the explosion of the Bessemer furnace gases used in making steam, which combined in some explosive proportion with the products of coal combustion. As in the Pittsburgh explosion the disaster came at the hour when work was stopped for a meal, it affected boilers which could by no possibility have all had low water at once, and no one can read the reports made on it without feeling, as we said at opening, that there is still much to be learned about some boiler explosions.—*Philadelphia Press.*

Brick for Street Paving.—A Detroit contractor who had occasion to do some work at Burlington, Iowa, has brought to the Michigan metropolis such good opinion of the brick pavement in service at Burlington that Detroit may be induced to experiment with it. If it is a fact that brick pavement, laid at a cost of $2 a square yard, will last from ten to twenty years—and the Detroit contractor says he saw at Burlington one street in excellent condition that had not been disturbed for seventeen years—the paving problem will be carried a long way toward solution. As this pavement is laid at Burlington, the foundation is prepared by levelling and packing the earth: which is then covered with ordinary brick, laid on their sides. These common brick are then covered with a few inches of sand, upon which vitrified brick are laid edgewise, close together, and covered with a light layer of sand. Milwaukee brick-makers can produce excellent hard brick suitable for a test of this pavement, and if it is found on trial that the brick pavement will withstand the wear of heavy teaming, it will be a good substitute for the noisy granite-block pavement which thus far has proved more satisfactory than any other pavement. At any rate, for residence streets, brick pavement would be much preferable to the wooden pavement, which in a few years becomes rank with decay.—*Milwaukee Evening Wisconsin.*

A New Thing in Catalogues.—This new nomenclature was recently adopted at the National Gallery:

OLD STYLE.	NEW.
Michael Angelo.	M. A. Buonarroti.
Francia.	F. Raibolini.
Paolo Veronese.	Cagliari.
Titian.	Vecellio.
Giorgione.	Barbarelli.
Correggio.	Allegri.
Gaspar Poussin	Dughet.
Claude.	Gellee.

Complaint has been made against it in the House of Commons.—*London Art Journal.*

The Age of Pulp.—The *Paper-Makers' Circular* (England), says that the new epoch on which we are entering will surely be known as "the age of pulp." Beyond esparto grass, straw and wood, few fibrous substances have as yet practically taken the place once occupied exclusively by rags; but if we should ever exhaust the sources from which we now obtain our supplies, there will assuredly be no lack of substitutes. East Indian ramie, pine-apple fibres, bamboo, bagasse (the refuse matter from sugar-canes), peat, bracken or common fern, flags, rushes, seaweed, tan, and hop-stalks have all been proved capable of yielding pulp. In Scotland hollyhock stems have been made into paper; in Ireland the mallow, red clover, hop vine, and yellow water-iris have been turned to the same use. In Demerara good paper has been made from the plantain. In France a patent has been granted for making paper out of leaves, which have been cut, pressed into cakes, and reduced to pulp by being steeped in lime water.

Bad Drains in London.—It is interesting to note from the eighth annual report of the London Sanitary Protection Association that more than 50 per cent of the drains of our houses are bad. Last year this association inspected 454 houses, and only 22 1-2 per cent of these were in good order; 10 1-2 per cent were in fairly good order; all the rest were either "rather bad," "very bad," or "bad," 35 per cent being of the worst category. As it is by no means the worst class of property that is subjected to the inspection of the Sanitary Protection Association we may take it as an understatement of the truth that every-other house in London is badly drained. It would have been interesting if the association could have added an estimate of the amount of expenditure that is necessary on an average to put the drains of a house in good condition. At present we can only remember our plumber's "little account," and shudder at the number of millions that would be required to meet the bill.—*Pall Mall Gazette.*

Ruin of Casa Grande.—Friends of the Hemenway exploring expedition will be gratified to know that the Judge civil act contains the following: 'To enable the secretary of the interior to repair and protect the ruin of Casa Grande, situated in Pinal county, near Florence, Ari., $2,000; and the President is authorized to reserve from settlement and sale the land on which said ruin is situated, and so much of the public land adjacent thereto as in his judgment may be necessary for the protection of said ruin and of the ancient city of which it is a part.—*Boston Herald.*

TRADE SURVEY.

Trade conditions are improving week by week. The volume of business is greater. Demands for material and merchandise of all kinds are increasing. Railroad traffic is heavier and manufacturers are running more cars this month than last. Disemployed labor is being set to work and employment is becoming more abundant, though there is no improvement in wages, or is any probable. Common labor is in more active demand throughout the newer sections of the country than in the older, because of the inauguration of a great deal of new work beginning with the highest construction and railroad work. Railroad-building will probably set in very actively in the summer. So far this year about 15,000 miles of road have been either let to contractors or are in process of completion, and some 53,000 miles of road in all have been projected. This is certainly a surprising and most encouraging exhibit. It means what has heretofore been pointed out, that as soon as railway management can place itself in harmony with public interests new roads will be pushed very rapidly. In New England seven or eight hundred miles are projected in small lines, ranging from five to twenty miles in length. In the Middle States some 5,000 to 7,000 miles are talked of, and nearly all of this mileage will be built in the next five years. Most of the new work is projected in the Western and Southern States. The rail-makers are hereby much pleased at the prospects for full employment later on in the year. Prices are very low for all kinds of iron and steel products. No improvement is likely to show itself till railroad work is entered upon with greater earnestness. Real-estate speculations are very rare. The demand for real-estate for dwelling purposes has seldom been better, particularly in the large cities. In many cities manufacturing sites can scarcely be had. This is the case in Pittsburgh where the manufacturers are compelled to go to the suburbs for room, and this is also true of Cleveland. In Chicago and St. Louis there are more opportunities for manufacturers, but even in these cities and among smaller ones the land is rapidly appreciating in value, and manufacturers are beginning to cast around for where the rate of taxes are more in their favor. This outgoing into smaller cities and towns has heretofore been noticed: the recent developments, however, emphasize this movement. Advices from architects in many sections of the country strengthen the observations recently made on building prospects for the season. Many architects have been engaged for the season in the smaller towns and cities, and are about to superintend building operations there of greater or less magnitude. Architectural ability is being placed before ordinary work. The old-time rule-of-thumb methods are being abandoned, and more confidence is being shown in the wisdom of architects. The younger men among the architects are finding encouragement which has heretofore been denied them. Their sphere is widening by superintending work which is not strictly architectural work, but which helps to round them up as architects, and it is creditable to them to be able to say that such opportunities are not permitted to pass.

The demand for all kinds of building material is better now than even two or three weeks ago, excepting for iron. The demand for structural material will be very heavy for the next two or three months. The use of iron is steadily increasing in large buildings. The tendency seems to be to adopt iron supports instead of timber, or more liberally in conjunction with it than in years past. The structural-iron makers have of late had a good many inquiries from builders for material to be supplied this season. There is also a very active demand for cement, brick machinery for terra-cotta, tile, etc., as well as for timber. The lumber markets of the country show that there is apparently an upward tendency in prices. When this tendency was manifested a month ago it was looked upon by builders and buyers as delusive, and simply a ruse of manufacturers and dealers to crowd up prices. It now looks as though the improvement were legitimate. Hemlock is in better demand. Poplar is picked up by wholesalers and retailers, and there is quite a scramble for it in Kentucky and Tennessee. Yellow pine is selling at an advance. Shipments of white pine are bringing equally as good prices as a year ago. Uppers have advanced. Hard woods in general are in good supply, but dealers are taking advantage of the better trade conditions to hold on for a firm price. Stone and slate are held at last year's full prices. A good many quarries have been opened, and, in fact, the spirit of competition has been manifested, and dealers and buyers have been obliged to take cognizance of it. It seems to be the concurrent opinion among a good many architects that this year will be an exceptionally busy one for both ordinary and fine residences. Residents of cities are seeking homes in the suburbs, and this accounts for a large number. A large number of residences costing from $5,000 to $10,000 are being built. Railroad companies will be also large buyers of material; builders of warehouses, terminal facilities, etc. Quite a number of belt-lines are projected. Not a few of them will be undertaken next fall or winter. The outflow of population into the West and South still continues. While new enterprises in the South are greatly magnified by journals interested in calling attention to this section, the fact remains that a great many profitable investments are being made there, and thousands of people are locating themselves where energy will find constant occupation. The smaller industries, with a few exceptions, are all doing well. The anthracite producers have undertaken the heavy task of maintaining last year's prices on coal. The heavy stocks in the Eastern and Western markets are a drag. They have inaugurated a restriction of production. Buyers are hoping that the drop will be made that will bring coal down one dollar per ton, which reduction could easily be affected without injury to the producing interests, according to current commercial opinion, and from the report of the Congressional Committee which investigated the cause of the Reading strike a year or so ago. There is a very active demand for bituminous coal from the Allegheny regions, as well as from Western Pennsylvania and from Ohio and Indiana block-coal regions. There is also a heavy demand for natural-gas for domestic and manufacturing purposes, and new wells are being bored in remote localities from the present well-known sources of supply. The Standard Oil Company is spreading its territory, and has prevented that development of natural-gas interests which would have taken place but for them.

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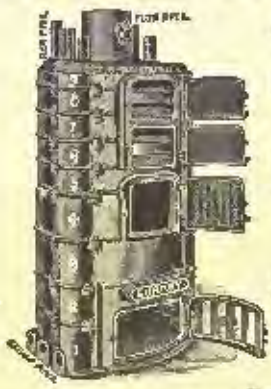

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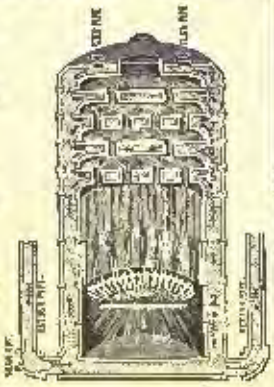

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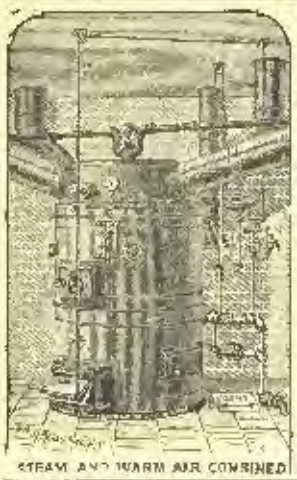

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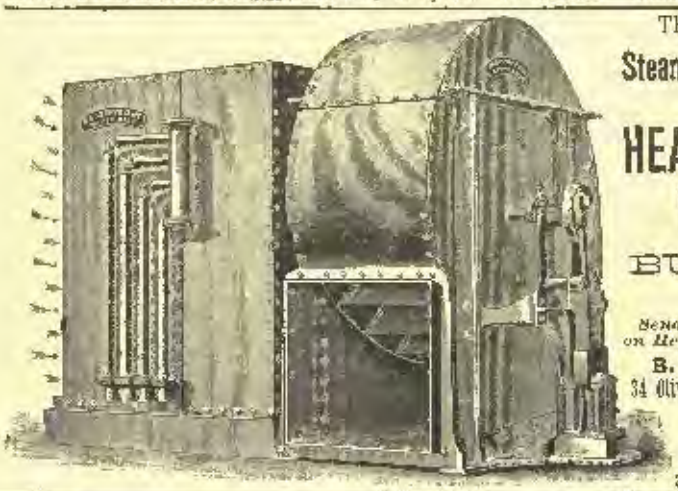

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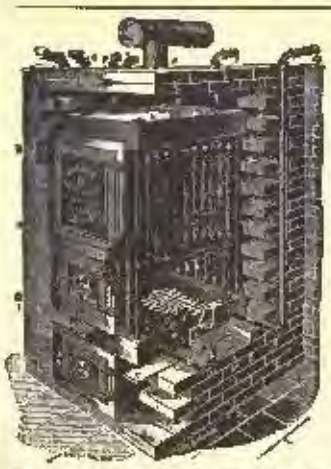

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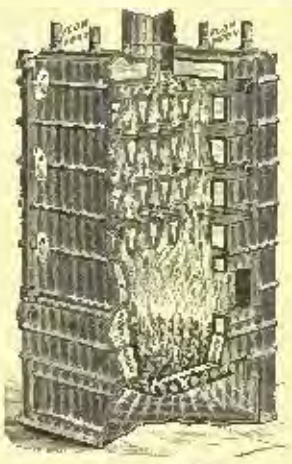

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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APRIL 27, 1889.

Entered at the Post-Office at Boston as second-class matter.

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A SERIES of lectures to artisans has been given this winter at the Carpenters' Hall in London, on subjects connected with the building trades. The last of these was given by Mr. Thomas Blashill, a well-known architect, and now Superintending Architect of Metropolitan Buildings, on doors. Most of his hearers being practical mechanics, Mr. Blashill had the good sense not to try to instruct them in the rudiments of door-making, which they undoubtedly understood as well as he, but brought together and explained a great variety of ancient and foreign examples, which would not only interest a mechanic, but would be useful to him by giving him resources for use in cases where the common patterns could not be applied. For instance, an English or American carpenter would be rather perplexed at being told to hang a two-inch door in a rebate only one inch deep, but, as Mr. Blashill showed, this is not only frequently done on the Continent, but it is the common way in France to make the rebate narrower than the thickness of the door, and rebate and mould the edge of the door, so as to make a neat finish. Of course, an arrangement like this almost precludes the use of mortise locks, but mortise locks are not much in favor on the Continent. It is interesting, but not surprising, to find that the joinery of modern England and America seems to have been derived from that of Holland, which it still resembles much more than it does that of any other Continental country. Not only are the Dutch frames rebated to receive the full thickness of the door, like ours, but many Dutch doors are framed with a vertical "muntin," or stile, in the middle, which is invariably found in ordinary English or American doors, but is never seen in a French or German door, unless it has been made expressly to imitate an English door, or has the muntin marked with a centre-bead down the middle, to look like a pair of folding doors. Probably on account of the large size of panel required for economical work with only two vertical pieces in the framing, the Continental door panels are invariably raised, while those of English and American doors are almost always plain. Moreover, our doors are much thicker than those on the Continent, a large French or German door being often only an inch thick, and few being more than one-quarter or three-eighths of an inch thicker than that, while an inch and a half is a very moderate thickness for our doors, and a large door is almost always nearly or quite two inches thick. Owing to the thinness of the Continental doors, neither mortise locks nor butt hinges can be conveniently used upon them, and the latter are replaced by the hinges on the face of the door which often so strongly excite our admiration by their beautiful design and workmanship. The rim-locks, which are also used with these thin doors, are usually placed so as to come partly on the lock-rail, and the knob, in France and Germany, is commonly set three feet and nine inches above the floor, and a lever is used instead of a knob. In England, as we know, a round knob is the rule, and it is placed about three feet and three inches from the floor. With us the knobs are placed lower than in England, three feet from the finished floor to the centre of the knob being a common and generally satisfactory rule. In Holland, the door furniture is something like that in England, but the Dutch still make great use of the oval and egg-shaped knobs which our ancestors copied or imported from them, and we have of late copied again from our ancestors. Mr. Blashill said nothing about what is perhaps the most striking peculiarity of the Dutch doors, the way in which many of them are made to open in two sections, divided by a transverse joint in the middle of the height of the door. This fashion, which is still very common in Holland, is preserved in many houses about New York, and must have a curious history, which we commend to the attention of some amateur of Knickerbocker archæology. The Italian doors retain a peculiarity of which the origin is more obvious, in the shape of a grated opening, which is almost always found in the outside doors of houses, at a convenient height for inspecting a caller before opening the door to let him in. Considering the sort of callers that a man was liable to have in Rome or Florence three or four hundred years ago, it is not strange that some such facilities for reconnoitring visitors should have become fashionable. The most interesting doors of which Mr. Blashill spoke, considered artistically, were perhaps the Moorish ones. These are framed like ours, but with the panels as thick as the framing, so as to give a smooth surface, on which stamped leather is often placed, and secured by brass arabesques, nailed over the whole. What a pretty suggestion this would be for one of our modern houses, we need hardly point out, and many ways will occur to architects by which a somewhat similar treatment might be carried out in other materials.

IT is gratifying to learn that so enterprising a town as Kansas City is "waking-up to its art needs," to use the expression that we find in one of the local journals, and has founded a school of drawing, in which the architects and builders of the city appear to have interested themselves so far as to found prizes, to be awarded to the most deserving pupils. We are glad to wish the utmost success to the new school, and particularly like the idea of placing it to some extent under the care of architects, and of builders also, if, as appears to be the case, the builders of Kansas City are exceptionally interested in fine art. The same writer, however, considers that it is desirable to have more pictures immediately imported "from the East" into the town, which is not quite the same thing as having its citizens make them for themselves. It thinks that if a demand for pictures were to manifest itself, it would soon be supplied, which is unquestionably true, the "Eastern artists," or at least some of them, having facilities for supplying such a demand which would probably surprise the Kansas City journalist. Not only can the artists in question furnish modern paintings in oil, of assorted subjects, at the moderate price of one to two dollars each, but, if report does not belie them, they can fit out the future "galleries" which are to adorn the metropolis of the Mississippi Valley with choice Rembrandts, Raphaels and Titians at about the same figure. These pictures, by the way, are really painted in oil, either on canvas or a tolerably good imitation of it, by what is called the factory system, each canvas passing by turns through the hands of the "sky-man," the "tree-man," the "foreground-man," and so on, until it arrives at the end, a picture complete in everything except that which makes a picture valuable. The productions of these factories are said to be extensively sold in the West, and a worse fate could hardly befall Kansas City than to be known as a good market for them.

THE affair of the addition to the Boston State-house, which at one time seemed likely to lead to unpleasant rivalries between the architects concerned, as well as to undignified controversies in the newspapers and before the legislature, appears to have been happily settled by the appointment of a consulting architect, who, in conjunction with the architects to whom the first prize was awarded, is to prepare a modified design, which is to be carried into execution. In this way the State observes the principle so strongly insisted upon by architects, that the execution of the work should always be given to the author of the design placed first, and at the same time satisfies the popular demand that "a first-class architect," i. e., one who would have nothing to do with the competition, should be concerned in the work. It will be observed that no one, so far as we know, has ever said anything against the skill or

ability of the winners of the first prize, but the fact that they were willing to compete at all on the terms offered, and still more so the fact that they should have done so after the almost unanimous withdrawal of the members of the profession in Massachusetts, appears to have created a presumption in the minds of the Massachusetts public, as, in fact, it generally does in such cases, that they must in some way be inferior to those who themselves set a higher price on their skill. Although we consider the whole scheme of placing the most costly and important part of the State-house in a separate building, at a lower level, and across a street, over and under which communication is obtained by means of tunnels and bridges, to be a most mistaken one, and the reason given for it, that it is important to preserve intact a certain dome of inch boards covered with tin, to be little short of absurd, the time has gone by for discussing that point, and we hope that the legislature will see that the disposition which its supreme wisdom has adopted is carried out as promptly and energetically, and with as complete an absence of unseemly squabbles and scandals, as possible.

SIGNOR MELANI writes to *La Construction Moderne* an extremely interesting letter about the history of the Campanile at Florence, from which it appears that our text-books on the subject ought to be immediately revised, and an immense amount of æsthetic rubbish extirpated from the sentimental literature of architecture. To sum up in a word, Signor Melani assures us, not on his own authority, but on that of persons whose conclusions cannot be disputed, that Giotto's Campanile was principally built by somebody else, and from designs which Giotto never dreamed of; while the Cathedral of Florence itself, instead of being the immortal work of Arnolfo, was the result of the successive labors of half-a-dozen architects, one, at least, of whom had quite as much to do with its design as Arnolfo. To begin with the Campanile, the records of Florence show without question that Giotto's work upon it ended when it had reached a height of about twenty feet from the ground. At this height the principal part of the spreading base only had been completed, including the hexagonal panels, which were sculptured by Giotto himself. At this point Giotto was succeeded by Andrea Pisano, an artist almost as renowned as his predecessor. Where Pisano's work ended is not quite certain, but a picture which is preserved in Florence, in the "Uffizii del Sigallo," indicates that it stopped at the height of the first large windows. This suggestion is confirmed by the fact that a writer contemporary with Giotto and his successors, speaking of the work that Pisano did on the tower, mentions that his employment was terminated on the discovery that he had made a change in the design of a sort which displeased the authorities in charge. What this change was, Pucci, the writer in question, does not explain, but Signor Melani points out that there are in the tower, at the height of the first story windows, some small pilasters placed in the line of the niches, which occur nowhere else, and are of an unpleasant effect. Whatever may have been the exact point at which Pisano was discharged, it is certain that he was succeeded by Francesco Talenti, who carried the building through to completion, and there is plenty of evidence that he treated the design of the upper part as he liked, without interference from any one. The usual romance about the construction of the Campanile relates that Giotto, before it was begun, made a model of it at a large scale in wood, on which every stone was marked and colored in imitation of the piece of marble which was to be used in that place. It is quite possible that the model was made according to the story, but it is certain that it was not followed. Not only does the internal evidence of the building, which plainly shows three styles of treatment, furnish, to an architect, convincing proof that it was not built in accordance with one design, but the familiar tradition in Florence, that it was intended to have a spire, indicates that a complete change of *motif* must have been made before the present cornice was devised. The exact character of the original design of Giotto is not described by any contemporary writer, but Signor Melani has discovered in the Uffizio dell' opera, or archives of construction, of the Cathedral of Siena, a drawing on parchment, of the fourteenth century, representing a tower, the lower portion of which is absolutely identical with that at Florence. At the line of the mosaic of little squares begins a variation between the drawing and the actual tower, which continues to the summit. In the drawing, the octagonal corner-buttresses, which, in the actual tower, are simply carried up and crowned with the same cornice as the wall between them, are formed at the upper end into pinnacles, while the whole of the upper story is made octagonal, and, rising between the buttress-pinnacles, carries a high octagonal spire, with gabled windows on the faces corresponding with the faces of the square beneath. This arrangement is familiar enough in Northern Gothic spires, but it is utterly unlike that finally adopted at Florence. Of course, there is no certainty that the Siena drawing is the work of Giotto, although Signor Melani, from the resemblance of the details shown in it to those employed by Giotto in the backgrounds of some of his pictures, believes that it is, but there seems to be a strong probability that it at least represents the Florentine campanile as it was first designed by Giotto, and that the variations of the present tower from the drawing show the design of Pisano, and, after him, of Talenti, who, it must be remembered, did not complete the tower until 1358, when Giotto had been dead twenty-one years, and his model, if it ever existed, had probably long been forgotten. Even if it had not been forgotten, moreover, it would probably have been thrown aside to make way for the devices of Talenti, who, though now almost unknown to fame, must have been a great man in his day — much too great a man, in fact, to submit tamely to carry out the conception of a dead artist of the preceding generation. Investigations into the records of the Cathedral of Florence show that the same Talenti was in 1357, while his work on the campanile was still in progress, commissioned to modify the design of the nave of the Cathedral, which was still incomplete, and in the following year he gave the designs for the decoration of the portions of the exterior of the nave wall nearest to the façade, which have since been erroneously attributed to Giotto and Arnolfo.

A GREAT many cat stories are just now circulating through the technical press. *Fire and Water* has two, illustrating the occasional connection of cats with conflagrations. According to the first, an Englishman, a few weeks ago, saw a cat on the roof of his house, and, after the British manner, thought it would be good sport for him to get a gun and shoot it. He got the gun and tried to shoot it, but the shot missed their mark, and pussy escaped to a neighboring tree. Meanwhile, the blazing wad had set the roof on fire, and the house was burned to the ground. Another lover of sport, in North Carolina, shut himself up with his cat in his store, and amused himself by throwing lighted fire-crackers at her. This diversion lasted, with great satisfaction to one of the parties, until a misdirected cracker landed in an open powder-keg, and the store, with its contents, were scattered over the surrounding country. The hilarious proprietor was blown under the counter, and was subsequently extracted from the débris, not so much injured as he deserved to be. The third story that we have to relate possesses a physiological interest. A woman in Liverpool, who had a pet cat, of which she was very fond, was seen by some neighbors to take the cat into the yard and cut off its tail by a blow from a hatchet. The neighbors, although she appeared just as kind to the cat after the amputation as before, saw fit to complain to the police, and the amateur surgeon was arrested. The defence was that the removal of the tail was necessary to save the cat's life. Every cat, the woman explained, has a worm in its tail, which occasionally takes a fancy to crawl up through the tail and back to the cat's head, where its presence causes the familiar and fatal "fits." The commencement of this pilgrimage on the part of the worm may be detected from the actions of the cat, which begins to run after its tail. In this stage of the disease, if the tail is cut off, the worm is removed with it, and the symptoms disappear, but unless this precaution is taken a fatal termination is inevitable. Although most of the lady's neighbors confirmed her theory, the judge unfeelingly replied that cruelty is not excusable because based on superstition, and fined her ten dollars and costs. With a few more judges of this sort, England would be a dangerous place to practice medicine in, for the cat-surgery has quite as much foundation as some of the methods of healing which are applied to human beings. Although the worm-theory is new to us, it is certain that cats are often troubled with a disease which shows itself by an inflammation and swelling at the end of the tail. The patient whirls round and round, endeavoring to scratch and bite its tail, and appears seriously out of health. Under these conditions, it is a matter of very general belief, if not of experience, that the removal of the inflamed tip of the tail effects a cure.

BUILDERS' HARDWARE.[1]—XXIV.

COMBINATION DIAL-LOCKS.

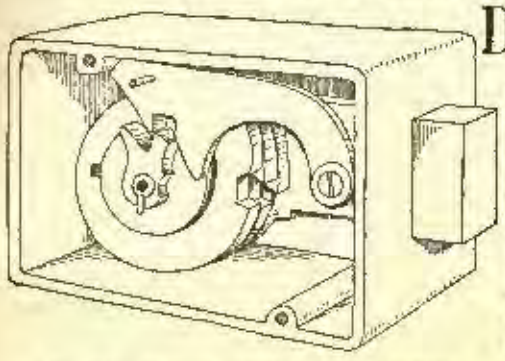

Fig. 343. Dial Lock. Demon Safe and Lock Works.

DIAL-LOCKS are used almost exclusively for safe and vault work, and so cannot be included under the general topic of Builders' Hardware. But, representing, as they do, the highest degree of perfection in the line of locks, a brief statement of the principles upon which they are constructed and worked, may not be out of place.

The external appearance of a dial-lock is familiar to every one, consisting of a rotating disk, graduated around the circumference either with letters or with numbers. To operate the lock, the knob attached to the dial-disk is turned a certain number of times to one side then to the other, etc., stopping each time on a certain number or letter, until the combination is set, when a single turn of the knob draws back the bolt. The internal arrangement consists of a series of flat, circular disks or tumblers, which rotate freely on the spindle of the dial-knob. In the edge of each tumbler is a notch, and the innermost tumbler is made with a dog which catches the tooth of a lever attached to the bolt. This inner tumbler is made fast to the spindle. On each face of each of the tumblers is a small peg, all the pegs being placed at the same distance from the centre of rotation; so that when the spindle is turned, the peg on the first tumbler strikes against the peg on the second tumbler, causing the latter to rotate, and in turn to start the third, and so on, so that with a four-tumbler lock, turning the spindle four times to the left moves the fourth tumbler to any desired number; turning next three times to the right adjusts the third tumbler, but does not disturb the adjustment of the fourth; then turning twice to the right adjusts the second, but does not disturb the other tumblers. When the slots in all the tumblers are brought to a line, a bar drops into them, permitting the bolt-lever to catch in the teeth of the first or locking-tumbler, when a single revolution will draw back the bolt. A single lock will illustrate the subject sufficiently for our purpose. Figure 343 shows the works of one form of safe-lock, used by the Damon Safe and Lock Works; and though this is a cheap lock, it embodies all the essential principles of every combination lock. This lock is susceptible of 755,000 different combinations, but some bank-locks afford as many as 134,000,000 changes.

There is absolutely no way to pick such a lock as this, except by "ringing the changes," that is to say, by making successively all the possible combinations, until the right one is found.

Combination locks cost from five dollars for the cheapest kind, to several hundred dollars for the most perfect styles of time locks.

MISCELLANEOUS LOCKS.

In addition to the regular lines of lever and cylinder locks, there are several forms which may be considered in this connection.

Tubular Locks. — Some cheap styles of lock are manufactured of such form that all the mortising can be done with an augur, being essentially the same in principle as the mortise door-bolts described in a previous chapter and illustrated by Figure 56. Figure 344 shows the construction of the "Hollenbeck Tubular lock." It is too simple and cheap to afford any very great degree of security as compared with an ordinary three-lever lock, but for some cases it would answer very well, as it saves seventy-five per cent of the labor ordinarily necessary to fit a common lock to a door. It is held firmly in place by the lugs at top and bottom, so it cannot work loose. Hollenbeck also manufactures a tubular latch on essentially the same principle. Several other firms have tubular locks listed in their catalogues, but they are too much alike and too simple to require further illustration.

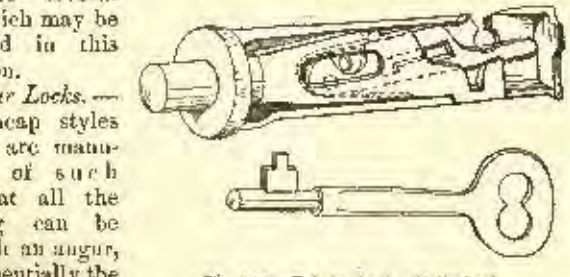

Fig. 344. Tubular Lock. Hollenbeck.

Electric Locks. — It is often desirable to have a lock which can be operated by any one at a distance from the door. In apartment-houses, clubs, etc., it is well to fit the front-door with a lock so connected with an electric battery that when a knob is pressed in an upper story a catch in the lock is drawn by the action of an electro-magnet, permitting the lock or latch to be moved. Any form of lever-lock might be adapted to this purpose, but there are a few forms of specially designed electric locks which are more commonly used. Properly speaking these are all electric-latches, as none of them have a locking bolt. Figure 345 illustrates "Thaxter's" electric lock. The pressure of a button closes the circuit through the electro-magnets, *A*. These act on the bent lever so as to release the arm, *B*, from its catch on *F*. The spring at *C* draws back *F* and *D* from the follow, *E*. The outside knob can then be turned and the door opened. When the latch is drawn back by closing the door, it carries with it the arm *F*, which resets itself so that the bolt *D* catches in the follow and locks the door. The latch is also fitted with a set of levers, so it can be operated by a key, independently of the knob.

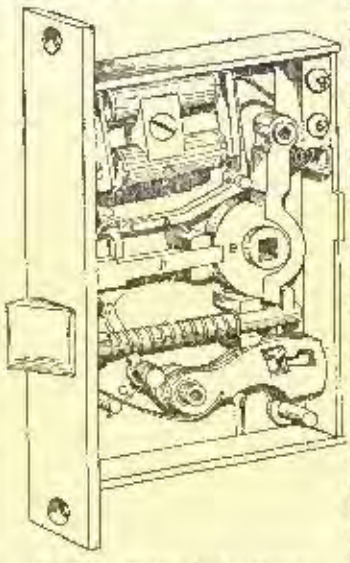

Fig. 345. Electric Lock. Thaxter.

"Fuller's" electric lock, Figure 346, is a trifle simpler. The magnets draw the armature *A* away from the cam, *B*, permitting the knob to be turned. When the door is closed the latch lifts the bent arm, *C*, and forces back the armature under *B*.

The "Thaxter" and the "Fuller" locks are the ones most commonly employed in and around Boston, though there are several other makes in the market, most of which are, however, asserted to be infringements of the patents.

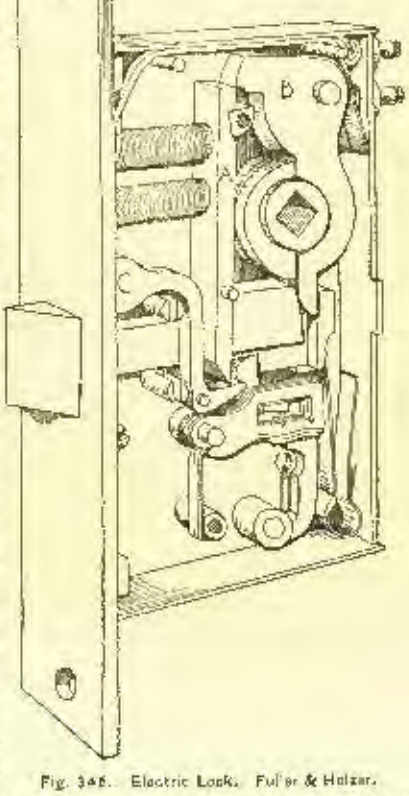

Fig. 346. Electric Lock. Fuller & Holzer.

Sliding-door Locks. — Figures 347 and 348 illustrate two types of sliding-door latch and lock. The locking mechanism used for this purpose is usually quite cheap in its construction, as a finely fitted lock is seldom required for sliding-doors. Indeed in many cases no lock at all is necessary. The bolt is curved and hooks down into the face-plate on the opposite door or on the jamb. The door-pull is either in the form of a hinged-lever, as in Figure 347, or a straight pull reinforced by a concealed spring, as in Figure 348. Both pulls can be pushed

[1] Continued from No. 605, page 185.

in flush with the face-plate. In some localities it is thought desirable to use knobs on the sliding-doors, one set of knobs

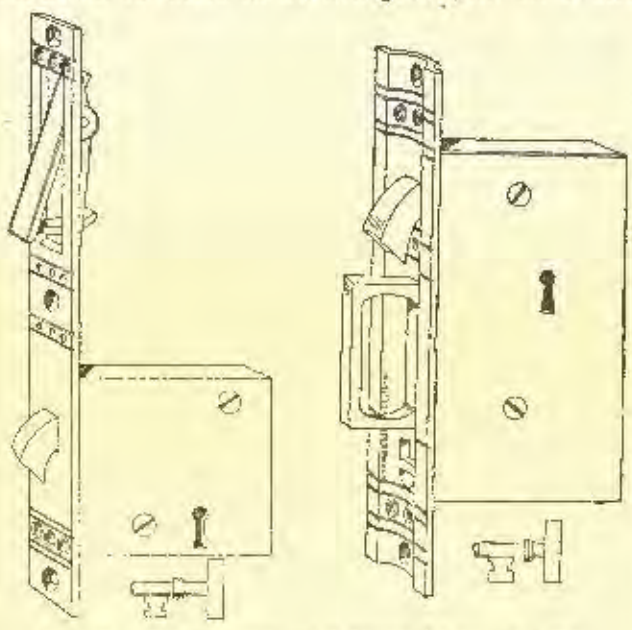

Fig. 347. Sliding-door Locks. J. B. Shannon & Sons. Fig. 348.

working the hook-latch, while the other knobs are simply dummies. In this case the key is used to lock the latch-bolt.

Drawer and Wardrobe Locks.—These are more properly

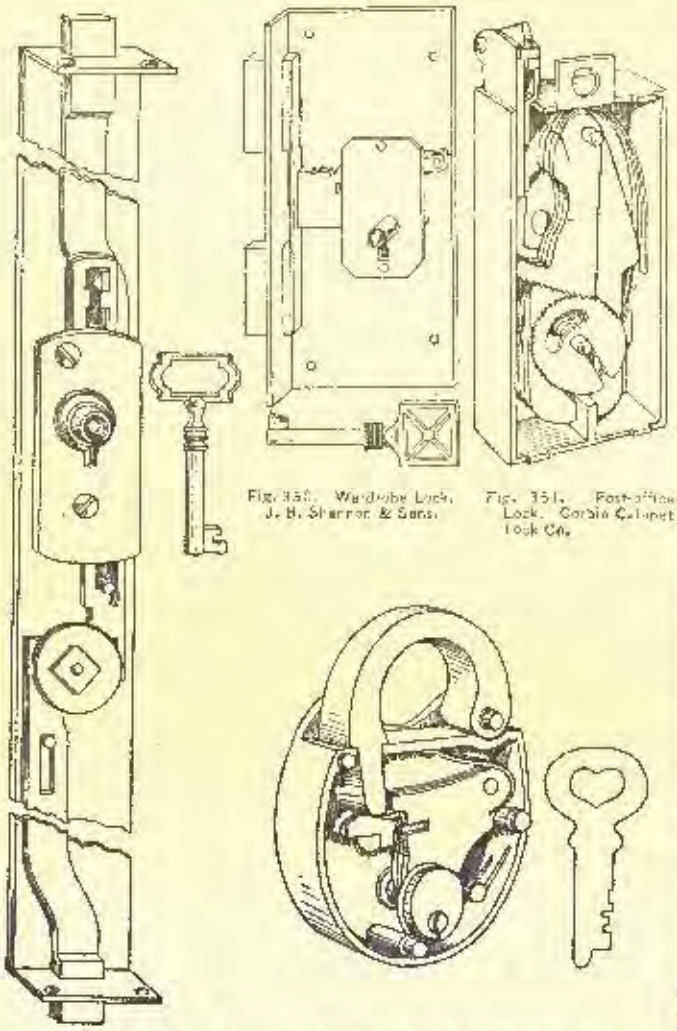

Fig. 349. Wardrobe Lock. A. G. Newman.

Fig. 350. Wardrobe Lock. J. B. Shannon & Sons.

Fig. 351. Post-office Lock. Corbin Cabinet Lock Co.

Fig. 352. Padlock. A. E. Dietz.

associated with cabinet-work than with builders' hardware, and will not be considered at any length. Drawer-locks are made in a great variety of sizes, from one to three and a half inches deep, and in all grades, from a simple bolt worked by the key, without levers of any sort, affording no real protection against intrusion, to the locks which are operated by Yale cylinders, having all the latest improvements of the Yale system, and being practically unpickable. Figures 349 and 350 illustrate two good types from the great variety of locks used for wardrobes and small closet doors. The first shoots a bolt up and down and is a fair, two-lever lock. The second shoots a double bolt horizontally. Both are gained into the inner face of the door.

The Corbin Cabinet Lock Company has recently put on the market a very ingenious change lock, intended specially for post-office boxes. It is somewhat upon the principle of the Day & Newell "Perantopic" lock previously described. Figure 351 shows the lock with the face-plate removed. Each lock can be locked by any one of a series of keys which can be extended in number almost indefinitely, all the keys being different in the arrangement and spacings of the notchings. But the bolt can be unlocked only by the key which was last used in locking it, so that the key can be changed as often as desired. In case the key is lost, an arrangement at the back of the lock permits the post-master to open the box and throw back the bolt, when a new key can be used, without in any way changing the lock, and the key which was lost would not then work the lock at all. Furthermore, the bolt is so arranged that it will turn back only sufficiently to permit the box to be opened, but not enough to allow the key to be withdrawn, unless the bolt is forced back by external pressure. The working is as follows: The upper levers are pivoted so as to permit of a rotary as well as a longitudinal motion. The second set of levers moves only laterally. The opposite edges of both sets of levers are notched, the width of the notches corresponding to the difference between the notches on the keys. Suppose the bolt to be unlocked: when the key is turned, the lower levers are first pushed to one side varying distances, corresponding to the notches of the key, and the upper levers are then drawn down and away from the post. As the key continues to revolve the levers interlock and the lower ones are forced sidewise by the springs, carrying with them the pivoted upper levers, which rotate so that the slot in each lever no longer comes opposite the post. At the same time, the bolt is shot out. It is evident that the action would be the same, no matter what key were used, only the sets of levers would not interlock in exactly the same relation. It is also evident that the only key which will rotate the upper levers so as to bring each slot opposite the post and permit the key, in turning, to draw back the bolt, is the key which last made the combination between the two sets of levers.

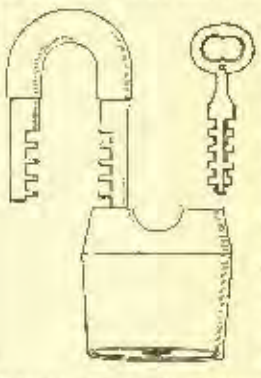

Fig. 353. Scandinavian Padlock. Russell & Erwin.

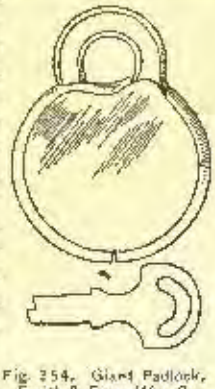

Fig. 354. Giant Padlock. Smith & Egge Mfg. Co.

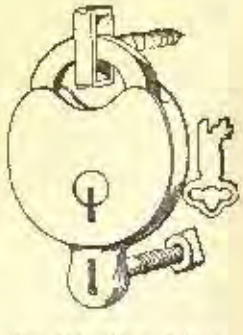

Fig. 355. Hasp Padlock. Stoddard Lock & Mfg. Co.

This lock hardly comes within the scope of builders' hardware, but it is too ingenious to pass unnoticed. The Corbin Cabinet Lock Company also makes a change lock for drawers, operating on much the same principle.

Padlocks.—The subject of padlocks is one which might be illustrated indefinitely, as there are quite as many different varieties as have been noted in regard to lever-locks, though with a few exceptions all padlocks are on essentially the same principle, consisting simply of spring-levers and a shooting-bolt, operated by a key in the same manner as an ordinary door-lock. Padlocks are now used but little about a house, as mortise or rim locks are usually more convenient, and at the same cost, are more secure. Only a few of the market forms will therefore be considered.

Figure 352 illustrates the internal arrangement of a very secure padlock manufactured by A. E. Dietz, the key, notched levers, etc., being somewhat similar to those in the Dietz

store-lock previously illustrated. Figure 353 is a form made by nearly all the leading lock-manufacturers. The key is inserted at the bottom of the padlock and rotates a set of levers which catch in the slots on both of the arms of the hasp. One arm is swivelled into the padlock case. Figures 354 and 355 are two other well-known padlocks, the former being used a great deal for government work and the latter having the hasp, staple and lock in one piece. The more common makes of padlocks are too well-known to require illustration.

LATCHES.

The ordinary door-latches have already been described in connection with the locks, but there remains quite a variety of latches which are made without any locking appliances, being intended simply to hold the door in position. Figure 356 shows the commonest form of latch used for elevator-doors, consisting simply of a bent lever, the lower arm of which is counterbalanced so that the lock will drop by gravity and

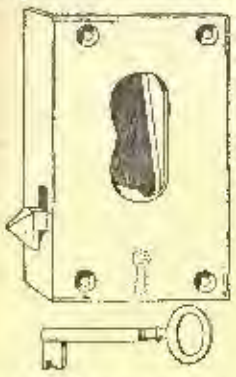

Fig. 356. Elevator-door Latch. J. B. Johnston.

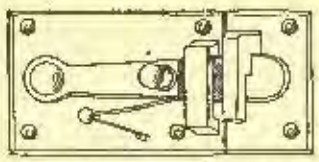

Fig. 357. Rim Sliding-door Latch. C. S. Sharpe & Sons.

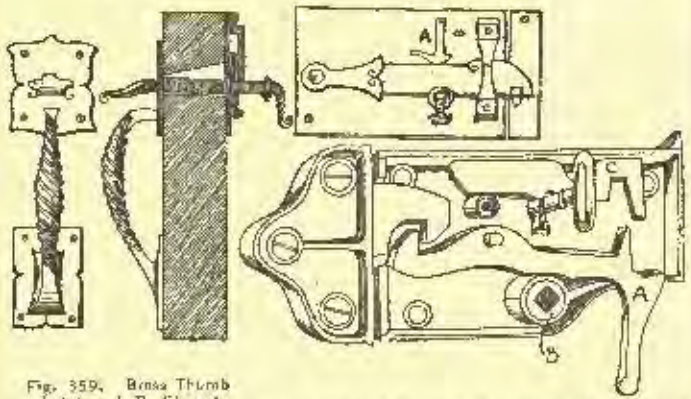

Fig. 359. Brass Thumb Latch. J. B. Shannon & Sons.

Fig. 358. Mack & Radway's Barn-door Lock. Kimrich & Britton.

remain closed until drawn back by pressure on the upper arm. Figure 357 is a very simple rim sliding-door latch; and Figure 358 is a very good rim door-catch which is self-acting, the hook being released by raising the lever *A*, either directly or by aid of the spindle, *B*, from the outside of the door; while it is locked from within or without, the slide *C* being moved so that *A* cannot be raised. Figure 359 represents one of a great variety of styles of thumb-latch, a very simple, old-fashioned form which is very suitable for some cases. Figures 360 and 361 are cheaper forms of thumb-latches, intended to be used only on screen-doors. Each of these styles has a lever of some sort, *A*, which serves to lock the latch. All of these patterns act by gravity. Figure 362 shows a spring-catch which is released by lifting or pulling out the handle on one side or by depressing the thumb-latch on the other, the latch being locked by the swing-lever *A*.

For French windows and cupboard-doors or for light screen-doors, one of the styles represented by Figures 363, 364 and 365 are employed. Figure 364 can be locked, and it and Figure 365 work with a spring.

PRICES OF LOCKS.

It has not been deemed advisable to publish in this connection any summary of the market prices of the locks which have been illustrated and described, as, without such an acquaintance with the subject as can come only by examination and comparison of the actual samples, any prices which might be given would be misleading, and would often be unfair criteria of comparison. The real value of a lock depends so largely upon the care with which the levers are fitted, and the care taken with such details differs so much with the various manufacturers that the price ought to be the last thing to be considered in selecting the locks for a house. A good lock by a thoroughly reliable firm can always be matched by a lock sold for considerably less money, which has the outward appearance of being exactly as reliable, and yet which is totally inferior.

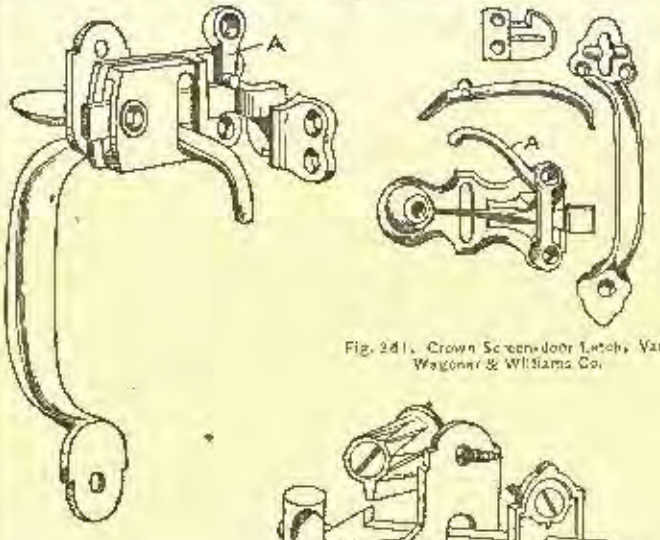

Fig. 361. Crown Screen-door Latch. Van Wagoner & Williams Co.

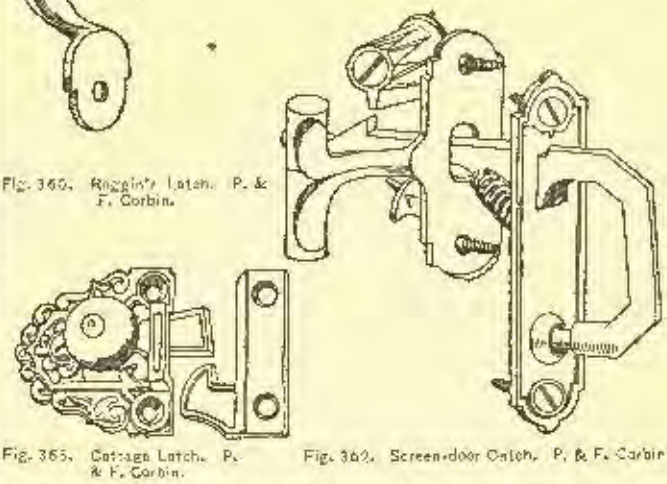

Fig. 360. Reggin's Latch. P. & F. Corbin.

Fig. 363. Cottage Latch. P. & F. Corbin.

Fig. 362. Screen-door Catch. P. & F. Corbin.

Surely the difference between good and bad workmanship could not be fairly illustrated by even the best of drawings, and it would never be wise to select merely from a trade catalogue. The only approximation which can be presented here is that previously given in the classification of locks by prices. It is of course very general, and consequently somewhat vague, and liable to exceptions; but it was prepared in conjunction with one of the largest hardware dealers in the

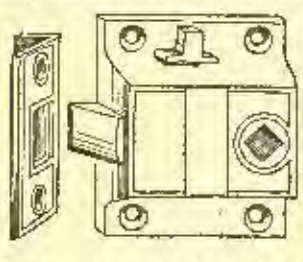

Fig. 364. Screen-door Catch. Reading Hardware Co.

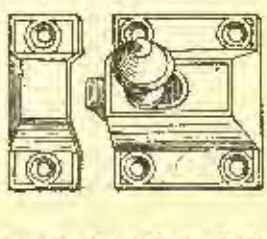

Fig. 365. French Window Catch. Reading Hardware Co.

country, and is sufficiently exact to serve as a guide to the general prices which should be paid, bearing always in mind that the wisest plan is to select only from the work of the best manufacturers and then only by samples.

The seventy-five or more locks which have been illustrated and described must be considered as types rather than as an exhaustive selection. A simple, three-lever lock is common property and several manufacturers whose names have not been mentioned in this connection turn out locks which are quite as good or better than those which have been selected for illustration. The difference would be entirely in the fitting or the finish, neither of which can be shown by the illustrations. All that can be hoped for is that this chapter may serve as a summary to guide in the general selection of the goods.

[To be continued.]

Why the Royal Academy exhibits no Water-colors.—It appears that the directors of the British National Gallery are not responsible, after all, for the fact that all water-color paintings are relegated to the basement, where very few persons ever dream of looking for them, but that they are precluded by the terms of the Government grant from either acquiring water-colors or exhibiting them with the works in oil. An effort will be made to amend this condition of affairs. — *N. Y. Evening Post.*

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

FIGURES FOR THE CALAIS MONUMENT. A. RODIN, SCULPTOR.

See article on "Auguste Rodin" elsewhere in this issue.

[Gelatine Print, issued only with the Imperial Edition.]

ARMORY, WORCESTER, MASS. MESSRS. FULLER & DELANO, ARCHITECTS, WORCESTER, MASS.

THE new building, which is to occupy the lot at the intersection of Grove and Salisbury Streets, facing Lincoln Square, is to be built of brick with brownstone trimmings, and is to be 67 by 85 feet, four stories in height. The second and third floors of the head-house will be for the use of the infantry companies. Each floor will contain two company rooms, 28 by 27 feet, the commissioned officers' rooms occupying the projecting bays at the front, while the rooms for the non-commissioned officers open from the rear. Each company will be provided with all the necessary rooms for uniforms, guns, dressing, etc., on the same floor. The fourth floor is occupied by a kitchen, 15 by 17, a large mess-hall, 37 by 44 feet, with band and drum-corps rooms at the front and a room for a gymnasium at the rear. The basement will be fitted up with dressing-rooms, harness-rooms, lavatories, boiler-rooms, armorer's-room, etc., while the basement under the drill-shed will be used as a magazine. A well-equipped rifle range, extending through the basements of the head-house and drill-shed, giving a distance of at least 200 feet, will be one of the features of the new armory. At the rear of the head-house, and connected with it, is the drill-shed, a partial view of which is given in the cut. This will be only one story high, 75 feet wide, and will extend back from the head-house 100 feet. The roof will be supported by iron arch trusses rising from the floor, which will be entirely unobstructed by pillars or partitions, thus affording an excellent place for drill. A small section, 16 feet wide, will be shut off from the rear end of the shed as a gun park for the artillery. This section is separated from the main hall by gates, which may be raised up out of the way. The entrance to the drill-shed for the artillery will be in the centre of the Salisbury Street side, and the rear corners of the shed will be bastioned and furnished with loop-holes, commanding the sides and rear of the building in case of need. The floors throughout the building will be of hard wood, and the finish will be generally in oak.

HOUSE OF C. J. PAGE, ESQ., WESTLAND AVENUE, BOSTON, MASS. H. L. WARREN, ARCHITECT, BOSTON, MASS.

THIS house, which was completed last autumn, is built of common brick laid throughout in Flemish bond in white mortar, with bands and arches of pressed-brick laid in red mortar. The diaper pattern across the second story is formed by using the same two materials: dark, common brick in red mortar, with a light pressed-brick in white mortar. The columns in the arched windows of first story are of Georgia marble. The balconies, lamps, standards, etc., are of wrought-iron. The interior is elaborately finished in hard woods: the dining-room is in quartered oak, with wainscot four feet high and oak ceiling, and has an arched brick fireplace-bay, in which are placed oak settles. The parlor is finished in mahogany, with carved pilaster caps in the windows. The hall is wainscoted eight feet high, and is finished in cream-white. In the roof is a large studio.

GRACE CHURCH CATHEDRAL AND GUILD-HALL, TOPEKA, KANSAS. MR. H. M. CONGDON, ARCHITECT, NEW YORK, N. Y.

THE Guild-Hall is built, costing about $25,000. The Cathedral it is hoped to commence in a short time and carry out in its completeness. Mr. Seymour Davis, of Topeka, was employed as superintendent of construction of the Guild-Hall, but the local papers have mistakenly given him credit as being the architect.

VIEWS IN VERONA, ITALY.

See article on "Italian Cities" elsewhere in this issue.

HOUSE OF BERTRAND E. TAYLOR, ESQ., NEWTON, MASS. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

A BIG BORED WELL IN CALIFORNIA.—M. R. Rose, of the Capital Iron Works of this city, has bored a well on R. D. Stephen's place, near Mayhew Station, which is the largest in this section of the State. It is thirty-two inches in diameter and 120 feet in depth. It is not only the largest bored well in the State, but it furnishes more water than any other. In fact, it is an inexhaustible reservoir that cannot be lowered. A sixty horse-power engine works a large centrifugal pump, that throws over 32,000,000 gallons per day,—more than our City Water Works pumps in a whole week, and what would measure in a ditch or canal over 1,000 miner's inches. So strong is the supply that this immense volume does not in the least lower the source of supply, and the water is as clear and pure as any obtainable.—*Sacramento (Cal.) Record-Union.*

AUGUSTE RODIN.[1]—VI.

EVE. Auguste Rodin, Sculptor.

IT was in this year, 1884, that Rodin began a bust of Rochefort. From the very beginning things did not go well with the Red Republican. As the work went on he became more and more dissatisfied, and finally would not give any more sittings. His explanation of his experience at the sculptor's studio is amusing. He says: "I went to the studio in the morning, sat down ready for Rodin to begin. Then he would look at me for an hour or two, turn to his work and look at that for the same length of time, put a bullet of clay carefully on it, and by that time we were ready for breakfast. On returning to the studio he would go through the same preliminary operation, and then take off the bullet. The bust never will be done." The sculptor, on his part, was equally dissatisfied with his sitter's impatience and total lack of appreciation, and, at last, he too, became disgusted. But the bullets had told their little story in the production of a great work of characterization. Though not completed it was cast in plaster, and declared to be, by Rochefort's assistant editors and friends, not only a superb likeness, but an astonishing piece of individualization. Plaster copies are now in the possession of several of the editors of Rochefort's paper, *L'Intransigeant*.

As time went on and Rodin's reputation increased, Rochefort experienced an awakened interest in the formerly despised bust of "bulleted" construction, and he indicated a willingness to resume the sittings he had before ridiculed. It was too late. The head that had looked Rochefort through and through by the hour, and had sent his cranium and visage into posterity as a powerful image in sculpture, had its sense of what was due to it and to art. The bullet process was not resumed.

In the early spring of 1885, Rodin was invited by a committee of the city of Calais to make a sketch for a monument to commemorate the heroic patriotism of Eustache de Saint Pierre and his five companions, who offered themselves as sacrifices to the demands of Edward III, the conqueror of the city in 1347. The original intention of the committee was a single statue of the principal personage, but Rodin included in his sketch the whole six in a group, St. Pierre being the chief figure. Of the several sketches sent into the competition, none of which had more than one figure, that of Rodin was accepted in the autumn of the same year. The superiority of the sculptor's sketch was commented upon by the Calais newspapers, and references made to the merits of his former work as a guaranty of a successful result. The receipt of this important commission was originally due to the friendship of artist friends. A pupil of Laurens's, named Isaak, told his master that his native city, Calais, proposed to erect a monument to those six men who went out to save their city from destruction, dressed as criminals in long shirts and with ropes about their necks, and asked him if he knew of a French sculptor that he could recommend as worthy to be invited by the committee to make a sketch. "Certainly," quickly answered Laurens, "Rodin is the one."

Rodin's last exhibition at the *Salon* was in 1885, when he sent a bronze bust of M. Antonin Proust, a former Minister of Fine Arts. If such were possible, it was spoken of with more enthusiasm than were the busts of Hugo and Dalou. The correspondents of nearly every important newspaper in Europe had some admiring word to say of this bust, some of them entering into quite a dissertation on its unique merits, an analysis of the genius of its author, and the probable effect upon French art of such a powerful worker in clay. In modern times, they declared, no one had ascended to so high a plane in bust sculpture. Among the notices was now and then a reference to the immense work upon which the sculptor was engaged in his secluded studio in the Rue de l'Université, and to the terrible difficulties he had encountered before he had become known. The appearance of this bust seemed to be a gratifying point of departure for the art-writers, and from which they passed in eulogistic review all of his previous works. The fact that Rodin had attained his enviable position without the help of any master or school was also commented upon. A few observations on this point, by Roger Marx, are as follows: "If one were obliged to judge the present condition of French sculpture by the works of the students at the Villa Medici (the French School of Fine Arts in Rome), as they are now seen at the School of Fine Arts, one would be led to conceive a sad opinion of French artists. But it would be an error to believe that noble art, elevated art, existed nowhere else, and that there was no health for it outside of the School. To mention the names of Puvis de Chavannes and Cazin, of Dalou and Rodin, is to remember temperaments of an essentially new kind, that develop without obeying any rule or following any conventionalism. These men represent the *grand art* of to-day—*as grand art* as there is—and you can study it in the first work you see treated with a free hand,

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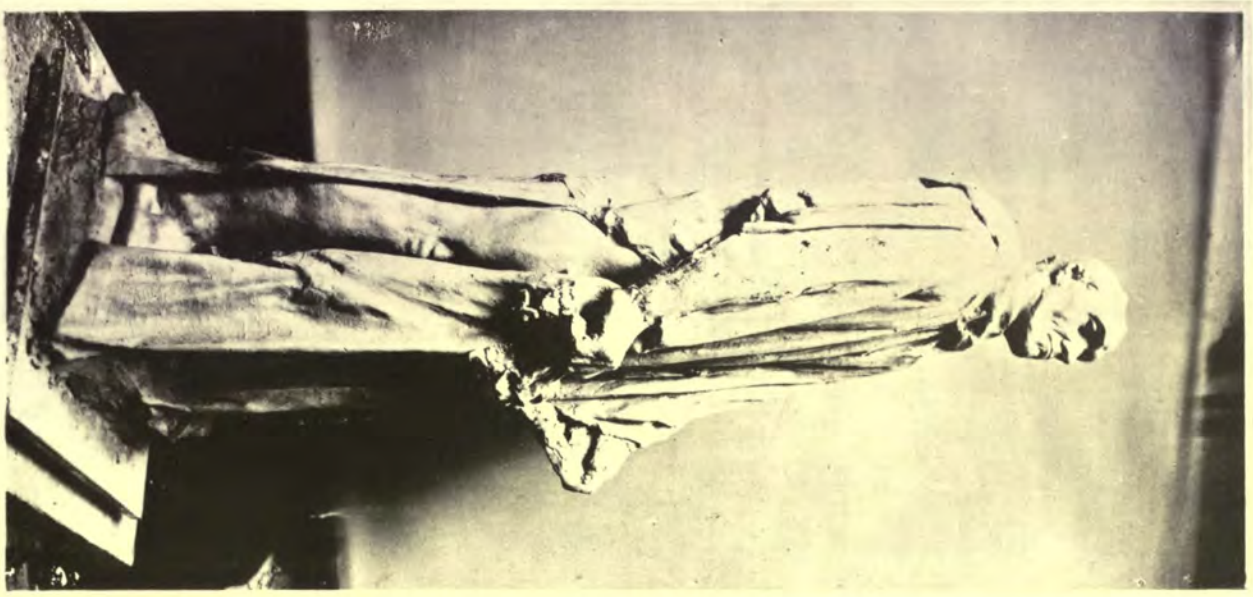
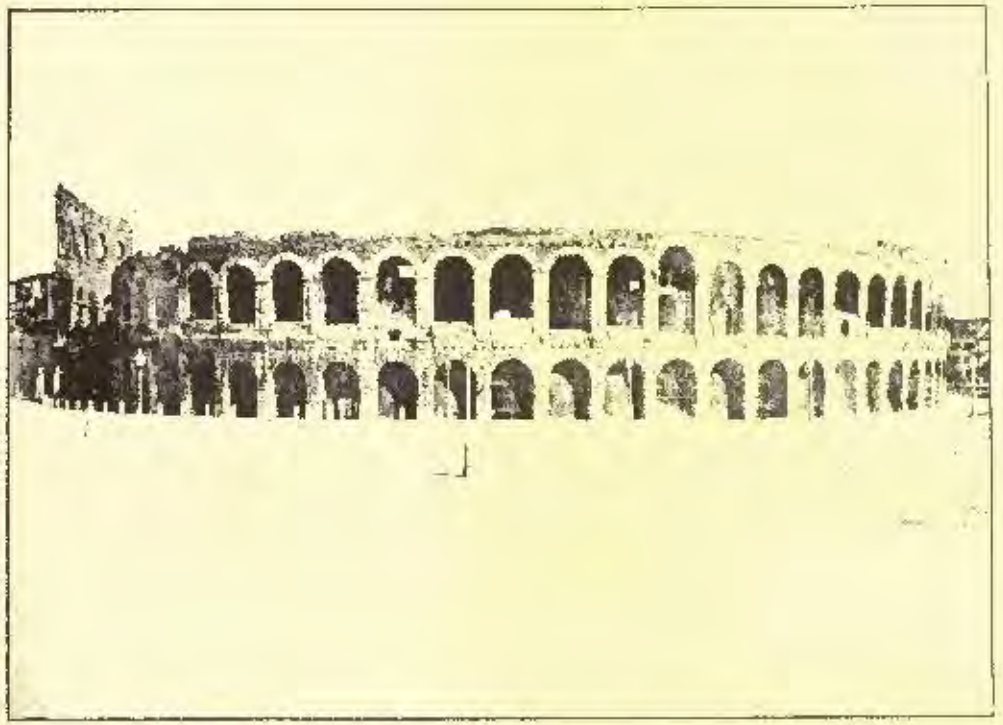


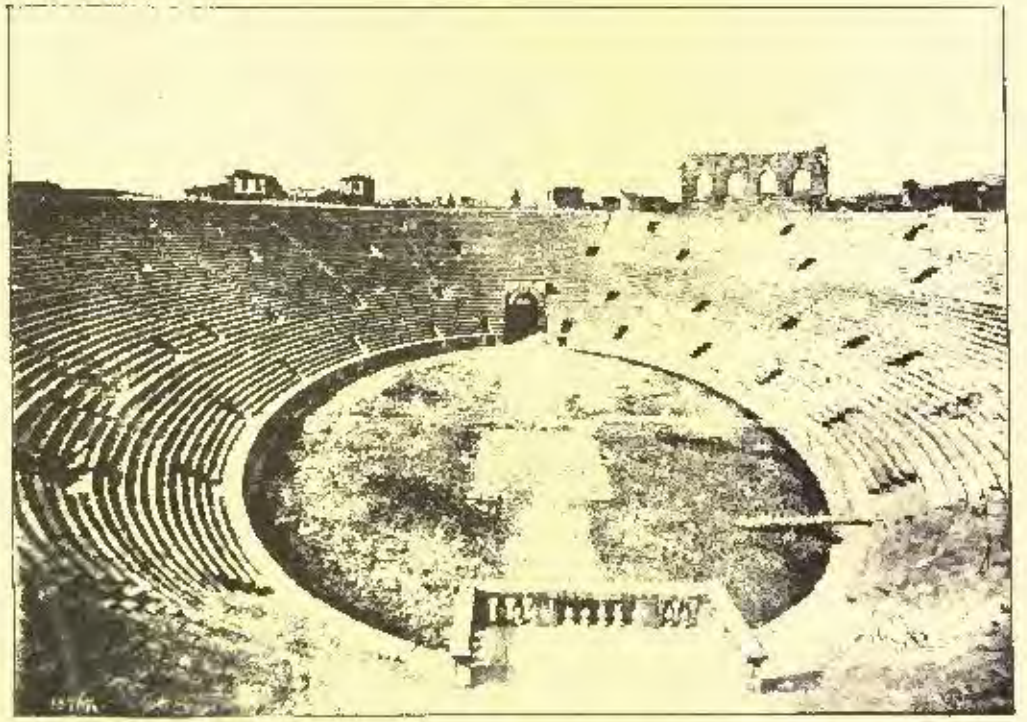
CLAY SKETCHES FOR THE CALAIS MONUMENT.

AUGUSTE RODIN, Sculptor.

Heliotype Printing Co., Boston.

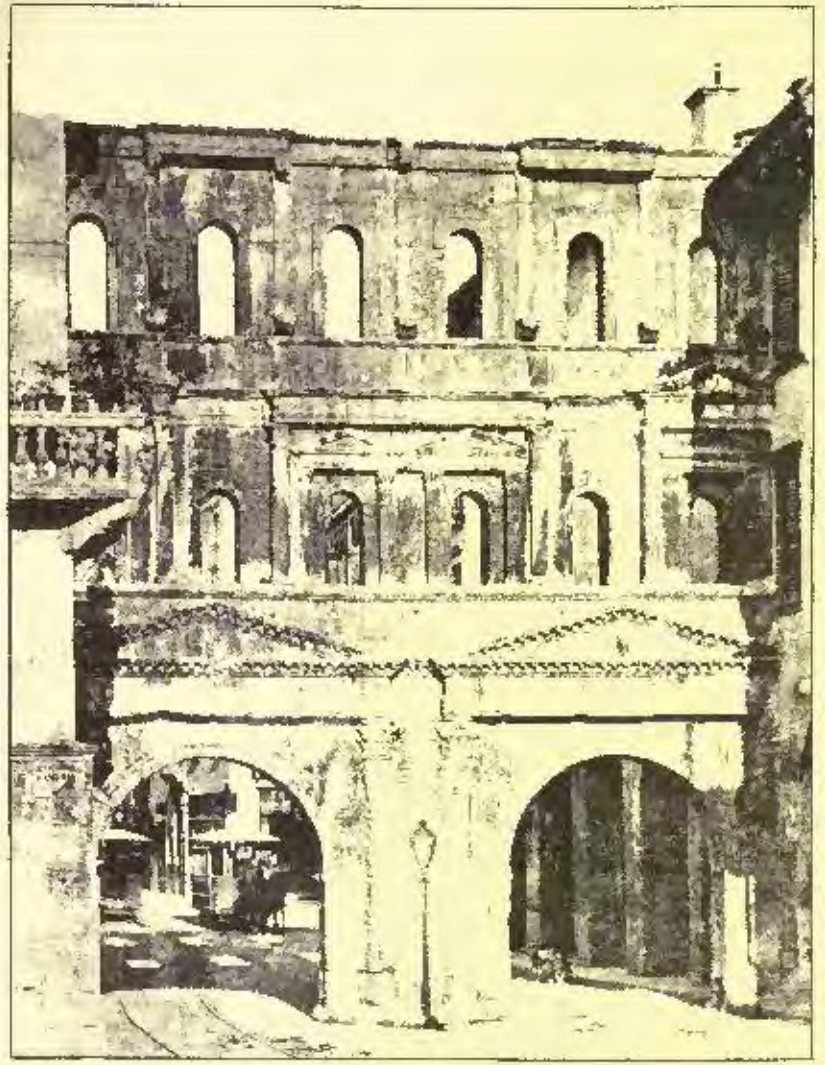


"THE ARENA."



"INTERIOR OF THE ARENA."

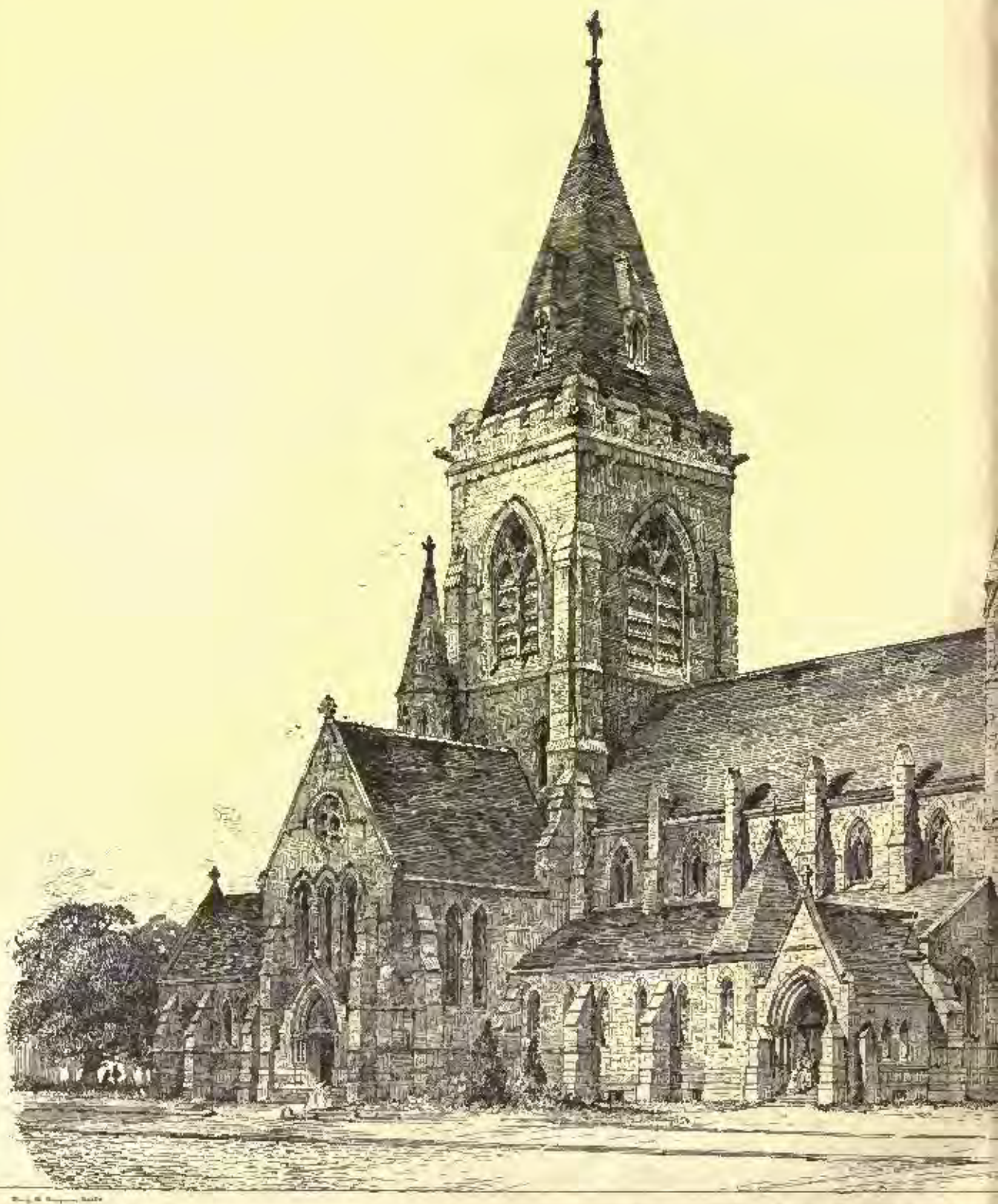
·TOMBS OF THE SCALIGERS·



·PORTA DEI LEONI·

·PORTA BORSARI·

·VIEWS IN VERONA: ITALY·



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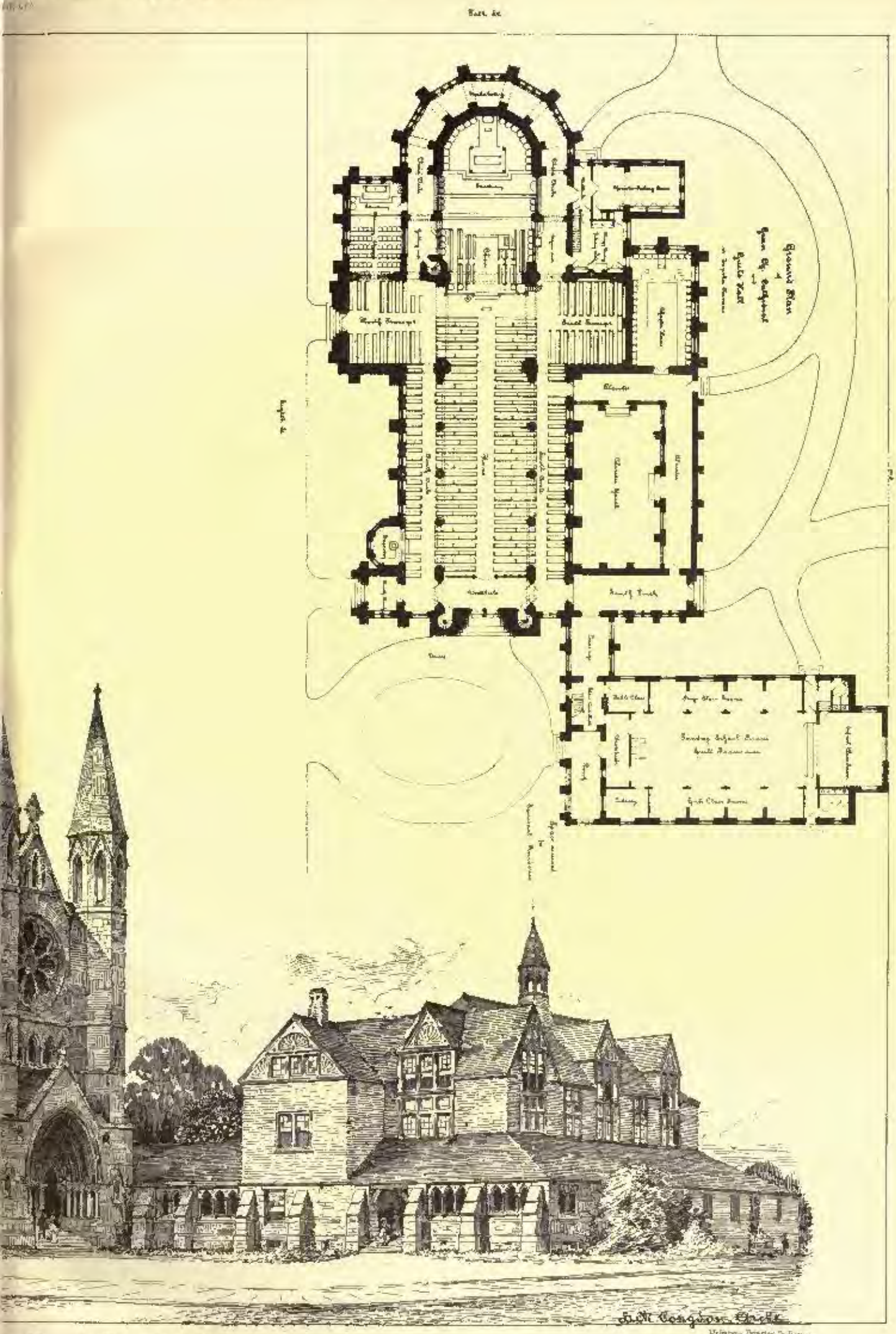
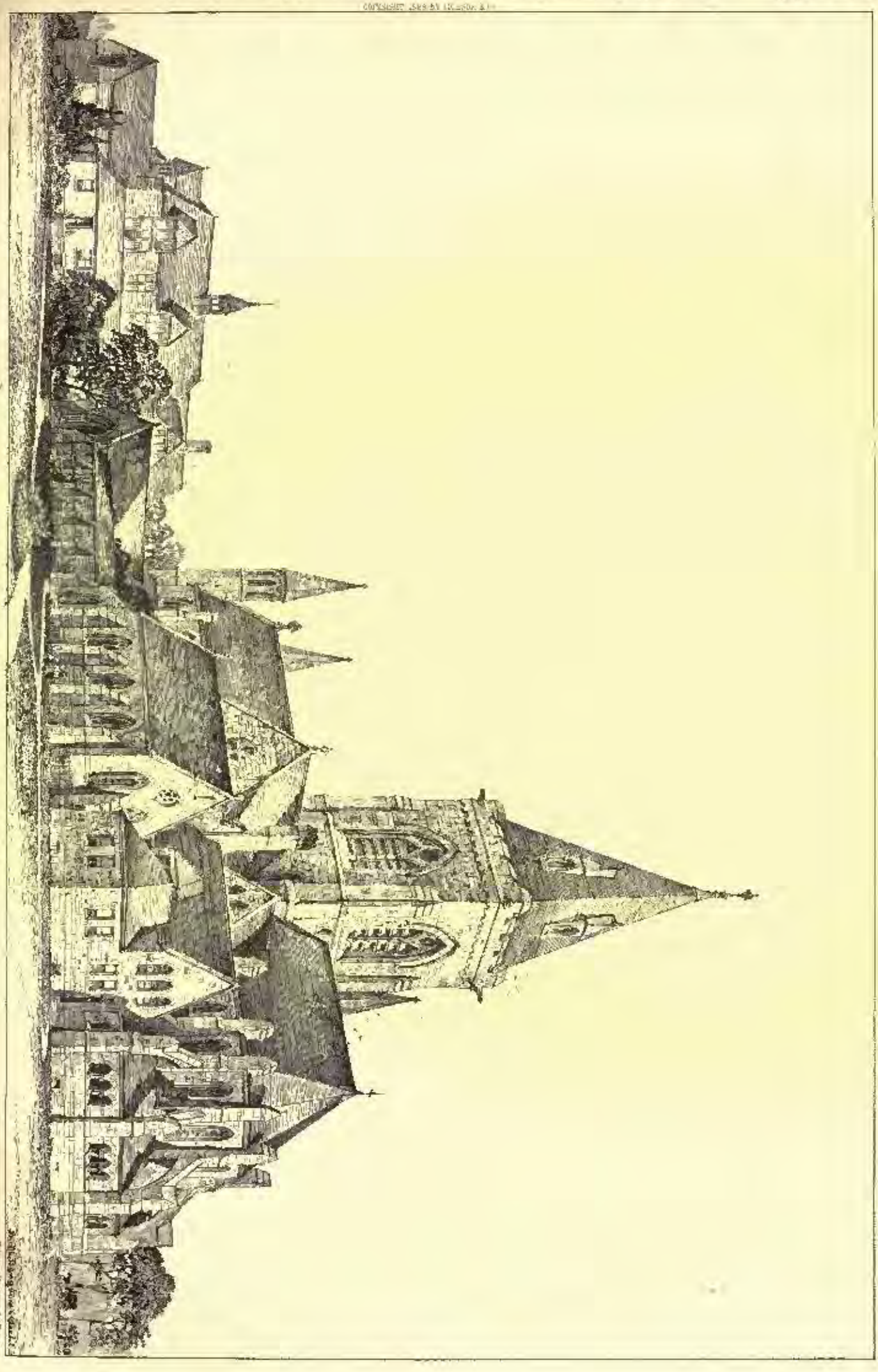


all at Topeka, Kansas.



Grace Cathedral & Guild Hall, Topeka, Kansas.

Heliotype Printing Co. Boston.

under such conditions as are absolutely necessary, to our way of thinking, for the conception and execution of a veritable work of art really worthy of the name."

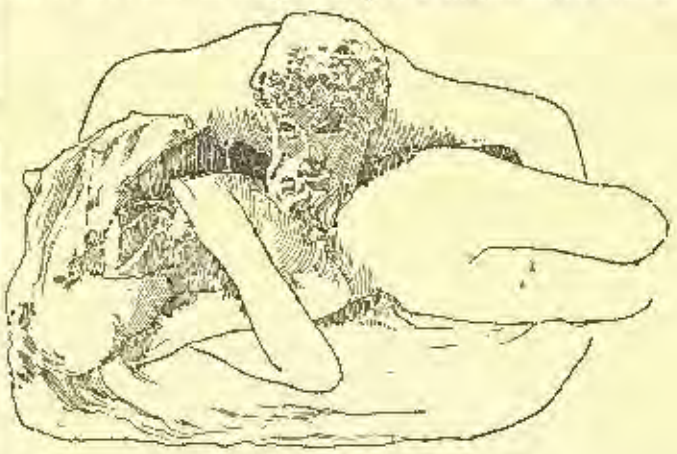
In the summer of this year, 1885, the commission for the statue of Bastien-Lepage, which was proposed to be erected to his memory in his native village, Damvilliers, was given to Rodin to execute, and it came about, says the latter, in this way: "The first time I saw Lepage was several years ago, at a club that met in the Rue Veron, called the Pieds Crottés. He was talking very loud and a good deal, his hair was brushed down over his forehead, and he made considerable noise generally. I said to myself: Who is this young chap who makes such an uproar? He can never be a friend of mine. Some time after this he came to my studio, expressed his admiration for my work, and after he returned home he sent me a very charming letter, full of appreciation of what he had seen, and assuring me that he would get some of his friends to buy my things. In a little while he came again and bought a marble copy of the figure of 'Sorrow,' which he placed in his studio as the only piece of sculpture there. We, of course, became the best of friends, and, after he died, the committee who had charge of the erection of the statue, and knew of our friendship, gave the commission to me. I made him painting in the open air, because he was the strongest living representative of that way of working. It will be a little larger than life. Lepage was a follower of Manet, with a little touch of the School. He had a great tenacity for nature, and was very sincere. He understood Manet better than any one, or as very few did. I did not understand Manet until Lepage led me to one of his pictures to show me how good they were. But I was not converted, though I found them droll. Afterwards, I became a great admirer of Manet. I saw that he was a great artist. He has made a tremendous impression upon French art, a great leader for those who came after him. Even prominent artists, who despised him when living, and won't commend him now, show in their pictures that they are willing to copy him. Some of the men who paint in the same style that Manet did, and especially Monet, are stronger than he was. The latter is a very great artist, one of the deepest seers into the mysteries and solidities of nature that we have ever had. Sometimes Manet was a little thin, though always in the right direction. Poor Manet! though such a reviving power, he is quite forgotten. You never hear his name mentioned."

Group from the Door. Auguste Rodin, Sculptor.

It was also during this year that M. Turquet placed to Rodin's credit the sum of seven thousand dollars for the purpose of paying for the casting of the door in bronze by the wax process; and the first well-paid commission that Rodin had ever received came this year from the Baron Alphonse de Rothschild.

Rodin's exhibits at the *Salons* of 1883-4 and 5 had awakened so much interest among art-writers that when that of 1886 came round, and nothing from his hand was seen, there was expressed a general regret. Allusions were made in regard to the superiority of French sculpture over the painting, to such men as Aubé, Dalou and Rodin as its best representatives, and to the fact that the latter had not been justly treated in any respect by the art authorities of the *Salon*. In regard to the last allusion, it was prophesied that although it was a disgrace to art to quarrel over such a man, there was complete consolation in the belief that the great statues of the Calais Monument and the surprising compositions for the great door, upon which he was then engaged, and which would be shown to the public in a short time, would forever set at rest the criticisms which had begun on his first arrival in Paris with "The Age of Brass."

The fifth International Exhibition of Painting and Sculpture at the galleries of Georges Petit, in the Rue de Seize, was open at the same time as the *Salon* of 1886. Rodin had been invited to contribute, and he sent his busts of Dalou and Rochefort, and a number of small plaster sketches of figures belonging to his door. The appearance of these sketches was the signal for a more general and analytical examination of the sculptor's genius, and for a renewed declaration of his superiority. At the close of a long article in the journal *Le Voltaire*, Roger Marx, said: "When this door is completed, perhaps in 1889 for the great exhibition, we shall see what a master of the true French line of Puget, Rudes and Carpeaux can do, one whom the sculptors keep at a distance—from fear or jealousy—and who will dominate them all by the incomparable strength of his talent, strange, original and profound."



Group from the Door. Auguste Rodin, Sculptor.

But it was not until the next year, at the same place, that Rodin took the entire Paris world of art by storm—critics, amateurs, and the most distinguished lovers of art. Even the sober and age-respecting *Gazette des Beaux Arts* placed its palm of admiring accord upon the now successful artist, by publishing the following article from the pen of Alfred de Lostalot: "Sculpture has for a representative, in the Rue de Seize, an artist of the first order who is rarely seen at the *Salon*, and whose fame has not yet passed the limits of the members of his profession and of the amateurs whose curiosity is strongly aroused. It is impossible in a few lines to analyse a talent so original and powerful as that of M. Rodin. All that we can say, is, that there will be a lively uproar in our world of art when the great door that he is making for the Museum of Decorative Arts, and his group of the 'Men of Calais,' are shown to the public. In the meantime we advise every one to go and see the plasters on exhibition in the galleries of Georges Petit, comprising fragments of these great works, and some finished pieces, the bust of Madam Rolt, and a group in bronze that Houdon would have called the 'Kiss.' The value of these works strikes the eyes at once; one feels that they are the emanations of the brain of an artist haunted by grand and original thoughts, and in whose hands the finest fancies take a new and imposing movement. Happily, M. Rodin is not without his faults, and he has found a place in this exhibition that agrees with his temperament, for he is also a seeker, a revolutionary, if you will, who in sculpture aspires to deliver us from the Greeks and Romans. Let us salute this man of convictions and wish him the best of fortune."

Group from the Door. Auguste Rodin, Sculptor.

Rodin's contributions to this exhibition were three of the statues, in plaster, for the Calais Monument, a sketch of the Lepage statue, a marble bust of Madam Rolt, a group in bronze belonging to Baron Rothschild, two groups in marble, a statue called "The Source," and a number of figures and groups, in plaster, belonging to the door. The articles concerning this exhibition of Rodin's works embraced the whole gamut of praise, appreciation and encouragement; of cutting illusions to the *Salon*—filled with academical nullities—and of bitter references to the shameful struggle that such an artist had had to pass through to get a foothold, even in beautiful Paris, and the surprise that the governing art authorities of the State had not discovered him long ago and filled his hands with the execution of great monuments. To some of the figures belonging to the door, that were

in the exhibition of the previous year, an occasional allusion was made in regard to the unusual freedom of their composition and action, and the slightest hint was given that too susceptible minds might not look at them with as chaste a feeling as the sculptor intended to convey.

The same point was alluded to in reference to several works in the present exhibition. After paying his admiring respects to the busts of Dalou and Rochefort, Armand Sylvester, in *L'Independance Belge*, says: "Then comes a series of works in plaster and marble that are evidently not intended to be used in the education of young girls." After describing a figure of *Eve*, belonging to M. Auguste Vacquerie, which he regards as, beyond comparison, beautiful, he continues: "We now approach the Baudelarian series that begins with a magnificent plaster group, representing a vigorous man who has lifted to his very lips the gathered-together body and limbs of an enamored and submissive woman. I cannot describe the trembling passion that is shown in this double movement of victory and defeat, with what fury this savage idyl is treated, the sharp and sensual perfume that it displays, the air of wild voluptuousness in which this scene is enveloped. As an inscription, this line — from the '*Flowers of Evil*' — dedicated to beauty: 'I am beautiful, O mortals, as a stone dream.'

"What melancholy in this other figure of despair on the plinth, of which I read these lines: 'How many flowers exhaust themselves in perfumed regret like a sweet secret in the depths of solitude.'

"Is it an Ariadne weeping for her absent lover? Rather a Sappho before being conquered by the virile love of Phaon. All this is but the threshold of the temple into which M. Rodin conducts us to the presence of the living idols of the flesh that are crucified by desire. Here I close all description. Never has physical love been treated with such truthful impetuosity, in such a sentiment of violence and despair. For there is a grand foundation of unsatisfied desire and mortal melancholy in these entwined bodies that stretch out in search of wild kisses, kisses that burn rather than refresh the lips. The august fraternity and the mysterious parentage of Love and Death are proclaimed, without ceasing, in these strange images, to which a noble sentiment has given a relative chasteness. For the beautiful is always chaste to a certain degree, as Diderot has said in an infinitely more picturesque language. In fact, all these little groups are incontestably beautiful. M. Rodin shows himself to be a greater artist than ever, and that is the essential thing, in spite of the *shocking* effect that sentimental misses will experience as they pass through this labyrinth of plasters."

The chief object among the sketches belonging to the door was a group which the sculptor called "Francesca and Paolo," but which others variously named "The Lovers" and "Love." It was made the subject of a long and appreciative article by Gustave Geffroy, and published in *La Justice* — too long to reproduce at this time. A catalogue description of the group would read like this: A young girl sitting in the lap of her lover, arms of both entwined around the bodies and necks of each, kissing as only lovers can kiss — both figures nude. To prudish minds this group would be deemed vulgar, to sane ones, a beautiful and chaste expression of the sentiment. This group was exhibited in Brussels and ridiculed because it was nude, the fact that it was a great piece of sculpture being almost entirely overlooked. Octave Mirbeau closed a brilliant article on these figures in these words: "Ah! what sovereign melancholy, and what love!" Still another group, more vividly or surprisingly dramatic, represented a female fiend of hell, or a syren of desperately sensual character, sailing through space carrying a bewildered lover upon her back. From the point-of-view of audacity of movement, nobility of line, dramatic force, living and human personality, the statues belonging to the Calais Monument were declared, by all writers, to be simply masterpieces. "No sculptor of modern times," they said, "has approached M. Rodin." "For richness of imagination, learned grace, robustness and power in the use of clay, and splendid truth in the representation of flesh, he has no equal." "Say what you will, the world must recognize this grand artist."

In 1886, M. René Goblet, the Minister of Fine Arts, delegated Rodin, and his friend Laurens, to go to Bourges to act as the sole judges in awarding the recompenses at an art exhibition. There had been provided for their disposal a lot of honorable mentions, and a Medal of Honor for each department of sculpture and painting. Now the good mayor of the city, who belonged to a noble family, had in his prideful charge the Bourges School of Fine Arts, the chief professor of which was his personal favorite. As naturally as water runs down hill, so did the mayor fancy that to the director of the school would be awarded the Medal of Honor in the Department of Sculpture. In the first place, this personage was the most distinguished representative of art in all the country round; and in the second place, he was the mayor's choice as the leader of the youthful art destinies of the city, and to whom else should this distinctive seal of approbation be entrusted! Both were doomed to disappointment, and their mortification cannot be described when they learned that the medal had been given to an hitherto unknown young sculptor, who, as a poor marble cutter, had sent to the exhibition a statue of "Louis II," and some busts and bas-reliefs.

In honor of the expected distinction of his protegé, the mayor had prepared a bountiful dinner for the evening of the day when the prizes were given, and to which the distinguished judges from Paris were invited, in company with the chief notables of the city. But the above unexpected and sorrowful event cast a very chill of death over the art professor and destroyed the joy of the generous official. But being a man of parts and undismayed courage, the mayor boldly and vigorously urged the artist representatives of the State to reconsider their decision, but all without success. Neither rich viands, cheering wine nor official urgency could move the hearts of Rodin and Laurens. Neither did this new disappointment deprive the host of all his wits, for he now asked them to explain *why* they gave the medal to the despised sculptor. To which Rodin answered, "Because he has the best things in the exhibition, yet you don't even know him or care to recognize him." And he added: "When you make another exhibition do it, first, for the benefit of your citizens, for their encouragement, then if you have not enough things and wish to send to Paris for more, get the best, and not the poorest, as you have now done. You ought to be proud to have a young man in your city who can show such a statue as the 'Louis II,' and the busts and bas-reliefs." This was a pretty severe lesson for the good mayor, but he bore it well, agreed with its good sense, and promised to follow Rodin's advice in the future.

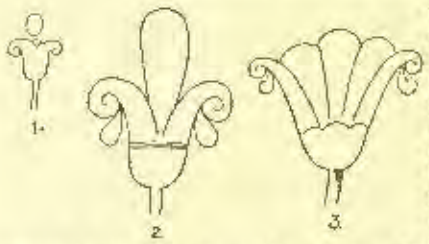
Barbier, was the name of the young sculptor. He afterwards came to Paris, got mixed up in politics and attempted to kill a member of the French Legislature. He came originally from the same place as St. Just, became an ardent believer in the tenets of that personage, and was, by many, considered crazy. So, incidentally, Rodin and Laurens encouraged a mad man.

T. H. Bartlett.

(To be continued.)

THE LOTUS IN ANCIENT ART.[1] — IV.

THE LOTUS AND THE PALMETTE.



THE object of my last paper was twofold — to eliminate the supposed papyrus from the list of Egyptian decorative motives, and to add to them the rosette as a picture of the ovary stigmas of the white and blue lotus. I now propose to explain the origin of the Egyptian lotus palmette. This will be found subsequently to bear on the development of the Assyrian palmette and of the Greek anthemion.

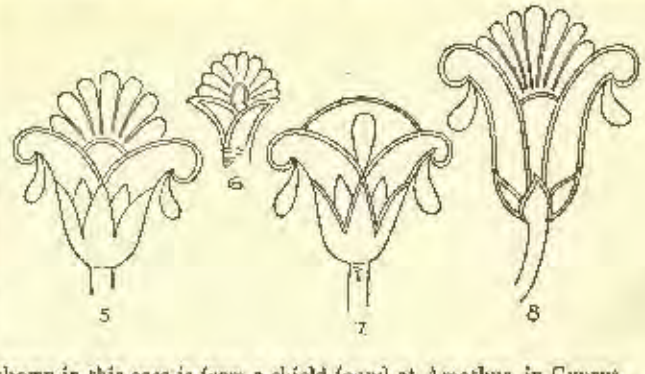
The matter already offered on the subject of the Egyptian Ionic will explain such voluted lotus forms as are seen in 1 and 2.

These may also be understood as lotuses, and as regards the exterior volutes, from the form 3. No. 1 is a voluted lotus supporting a seed of the rose lotus (from the "*Description de l'Egypte*," V, Plate 80). No. 2 is a voluted lotus supporting an inverted bud (from Prisse d'Avennes) — cases analogous to those illustrated in the last paper.

No. 4 from Prisse d'Avennes, then appears as a voluted lotus supporting the ovary stigma, a case analogous to the lotus flowers and buds supporting rosettes previously illustrated.[2]

No. 5, an Egyptian palmette of the eighteenth century B. C. (Prisse d'Avennes), one of the commonest motives of Egyptian decoration, is thus explained as a lotus palmette in which only a portion of the rosette (ovary stigma) appears in plan, the rest being concealed by the flower.

In Egypto-Phœnician decoration No. 6 is a common and related lotus palmette, differing only by the absence of volutes. The detail



shown in this case is from a shield found at Amathus, in Cyprus.

No. 7 is seen to be either an abbreviated and conventional outline of 5 (within which an inverted bud is placed as in 2), or the palmette may represent a portion of the top of the seed-pod of the rose

[1] Continued from No. 682, page 166.

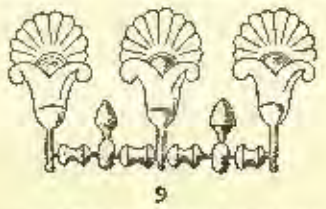
[2] For convenience of reference and direct comparison, the cuts herewith are reproduced from the preceding article: *a*, ovary and stigma of the blue lotus; *b*, ovary and stigma of the white lotus; *c*, lotus flower supporting ovary stigma; *d*, lotus bud supporting ovary stigma.

lotus, on which there are no rays. (Compare cuts 20 and 21 of the last paper.)

No. 8 is another modification of No. 5.[1]

Nos. 9 and 10 are motives in gold jewelry illustrated by Prisse d'Avennes; 10 relates to No. 2; 9 to No. 5.

No. 11 is a rough sketch of a portion of the gold handle of a tray in the Boston Museum of Fine Arts, presumed to be of the twenty-sixth dynasty. In this case the palmette is elongated for decorative



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reasons. The most important forms are those of Nos. 12, 13 and 14. The designs are of Egypto-Phœnician art in metal (bronze and silver) from the most famous Etruscan tomb in Italy — the Regulini Galassi.

This tomb and the "Grotta Campana" are the earliest Etruscan tombs known in Italy. Its construction relates it to those of Mycenæ and Tiryns as regards antiquity. It cannot in any case be dated later than the eighth century B. C. A much higher antiquity can be assigned to similar palmette designs, as it will be shown in a later

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article that they were copied in Mycenæ pottery designs of the second millennium B. C. From these motives we have no difficulty in reaching the palmette pure and simple, as found in blue enamel examples of the Boston Museum, Nos. 15 and 16 (Hay Collection).

In Mariette's photographs from the Boulak Museum, the photograph No. 17 for the tomb amulets shows three such examples in the centre of the plate, so that the palmette clearly appears to have been for Mariette's comprehension a typical Egyptian form.

In the lotus palmette examples herewith offered as combinations or derivatives of the voluted lotus and the lotus rosette (ovary stigma) the question of dates offers no difficulty — that is in case an influence from the side of the Assyrian palmette should be suggested. Sufficient examples can be proved to date from the eighteenth dynasty to clear up any suspicions on this head. The earliest remains of Assyrian ornamental art and the earliest Assyrian palmettes are nine centuries later.[2] Moreover, the tables can be turned on the Assyrian palmette in such a way as to make it appear that this is derived from the Egyptian lotus palmette, and not from the palm-tree.

It has been observed in a preceding article that Assyria was an Egyptian province under the eighteenth dynasty. The relations of the Phœnicians to Egypt and Egyptian art have been explained.

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The geographical position of the Phœnicians on the Syrian coast, midway between Assyria and Egypt, made them the natural mediators between the civilizations of the two countries.

Objects of Egyptian style are found in great number among the Assyrian remains, and the influences of Egyptian ornament on the Assyrian art are universally admitted.

Among these ornaments of admitted Egyptian origin are the Assyrian lotus motives, to which I have proposed in the preceding article to add the rosette. The outlines of the Assyrian palmette have an undeniable resemblance to the form of the palm-tree, as represented on Assyrian reliefs (see illustrations in the first paper on the Ionic capital), but there are absolutely no traces of a decorative development by which the ornamental palmette form was evolved from the natural palm-tree. Above all there are no cases in Assyrian art in which the palm-tree itself is used as an ornament, while the instances to be quoted for the natural lotus form are simply innumerable. Symbolical use of the palm can probably not be shown to have been frequent much earlier than the Christian era. There are one or two rare instances of palm-trees on the Assyrian or cylinder seals, but these are cases in which the natural aspect of the tree is fairly represented. The palm-tree proper appears in the Assyrian sculptured reliefs purely as part of the natural scenery, and never as an ornamental detail.

On the other hand, the resemblance of the Assyrian palmette to certain forms of the Egyptian lotus palmette is so close that a derivation of the one from the other appears absolutely certain.

No. 17 is an Assyrian motive from a cast in the Boston Museum of Fine Arts. Its relations to 13, 14, 15 and 16 are sufficiently striking. It may be added that Phœnician bronzes, with the Egyptian motive 14, have been discovered at Nineveh, and published by Layard.

No. 18 is another form of the Assyrian palmette which is easily reached from 17.

In the case of the Egyptian palmettes we have, aside from the precedence of dates, a precedence of at least seven centuries, a detail which forbids the counter hypothesis of reaction of an Assyrian form on Egypt. The little tabs or streamers which appear under the volutes of 2, 3, 4, 5, 7, 8, 10, 12, 13, 14, 15 are distinctively Egyptian. They are possibly to be conceived originally as lotus buds, and appear to have this significance as reversed in the cut 30 of the second article on the Ionic capital and the lotus, but whatever their meaning they are clearly an ear-mark of the Egyptian lotus motives. It is certain that their constant appearance in so many different lotus motives separated by remote periods of time is a feature of that curious conservatism and adherence to traditional usage, which is so distinctive of the Egyptian character and art. On the other hand, the Assyrian art would be naturally bound by no such conservative or traditional feeling, and thus we understand how the palmette form itself passed into Assyrian usage as an ornament without the extraneous appendage, which in Egyptian use was rather a tradition than an essential ornamental feature.

As the Persian art is a continuation of the Assyrian and Babylonian, the appearance in it of palpably Egyptian lotus palmettes

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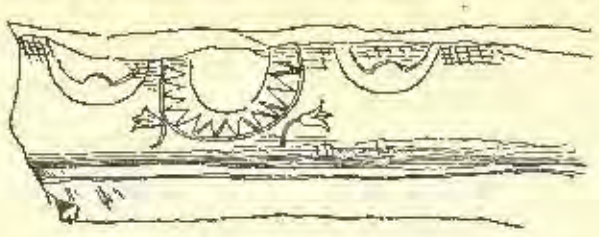
may be considered a corroborating argument. No. 19 is a relief-detail from Persepolis. No. 20 is a detail of tile decoration from Susa (excavations of M. Dieulafoy). No. 19 is a variant of 6; No. 20 is a variant of 11.

ASSYRIAN "SACRED TREE."

The Assyrian "Sacred Tree" combination of palmettes offers a new argument in favor of the lotiform character of the Assyrian palmette. The two typical forms of the Assyrian "Sacred Tree" are shown at 21 and 22.

I am advised by a competent Assyriologist, Prof. A. L. Frothingham, Jr., of Princeton College, that the cuneiform texts offer no information as to the meaning or origin of the "Sacred Tree," and that it does not appear in the earlier Chaldæan period. This is also apparent from what has been said as to the late appearance of the palmette form in the Tigris-Euphrates valley. So many Chaldæan cylinders have been found, that they furnish fair negative evidence as to the appearance of the "Sacred Tree" of palmettes in earlier times than the ninth century B. C.

It is clear, however, from the monuments that the "Sacred Tree" of palmettes is connected with the worship of the sun, as the winged



23.

solar disk frequently appears above it and the attendant worshippers (see the plates of Layard). The relations of the lotus to the solar cult of Egypt have already been explained (first article on the Ionic capital), and the same relations appear in the art of the Phœnicians. Figure 23 represents a Phœnician relief from the neighborhood of Carthage, in which the solar disk and crescent appear with the lotus. We have found an illustration of the lotiform significance of the Ionic capital in the support of the solar disk in the Sippara tablet

[1] No. 6 is a detail from Owen Jones's "*Grammar of Ornament*"; No. 7 is from the "*Descriptions de l'Egypte*"; No. 6 is from Columna-Cesnola's "*Monuments de Chypre*." The other numbers so far are from Prisse d'Avennes's motives of ceiling panels and borders in tombs.

[2] According to Maspero the eighteenth dynasty begins about 1800 B. C. The earliest Assyrian palace which has been excavated belongs to the ninth century B. C. — the latest belongs to the seventh century. There are no remains of Assyrian ornamental art earlier than the ninth century known at present.

(Figure 35, second article on the Ionic capital); in the Ionic stèle supporting the crescent and the solar disk (Figure 31, second article on the Ionic capital); in the appearance of the solar disk and crescent on Ionic stèles and capitals of Cyprus (Figures 10 and 30 of the same article); in the Ionic capitals supporting the winged solar disk at Boghaz Keui (Hittite relief, Figure 35, same article); and in the lotus-Ionic stèle, with head of Isis (moon-goddess, Figure 11 of the same article). Finally, Assyrian seals and cylinders are extant in which the lotus flower itself is represented before the worshipper of the winged disk or of the crescent-moon.

To these indications that the "Sacred Tree" of Assyria is a phase of the same associations between the lotus and the worship of the sun which are otherwise proven to exist for Assyrian, Phœnician and Egyptian art, still others may be added. Worshippers of the "Sacred Tree" hold branches represented at 25, 26, 27, 28—details taken from plates in Layard. These branches represent ceremonial and symbolic insignia, probably in metal, borne by the worshippers or priests. No. 25 is a branch of lotus flowers with rosettes (ovary stigmas) at their base. No. 26 represents a branch of lotuses with rosettes and lotus buds. No. 27 is a branch of lotus rosettes; 28 is a branch of lotus palmettes.

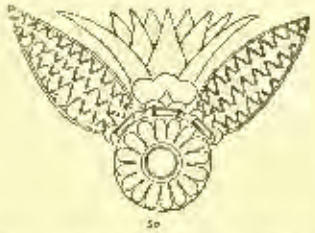
24.

25 26 27 28 29

To these associations still another argument may be added. An object frequently held by the divinity facing the "Sacred Tree" has been generally interpreted as a fir-cone. This interpretation has been suggested by a purely external resemblance, and there are absolutely no symbolisms known or records extant which would explain the use of such an attribute. No coniferous fir-trees are represented on the Assyrian reliefs, according to a recent article in the *Babylonian Record*. The lack of authority for this interpretation, and its want of meaning, have lately prompted the suggestion in the *Babylonian Record* that a citron is indicated.

No. 29 is a detail of the bud-shaped object held by the divinity facing the Sacred Tree.

An obvious interpretation of this supposed fir-cone is suggested by the treatment of the lotus bud in Assyrian relief. No. 30 is a detail from the lotus decoration of an Assyrian slab in the Metropolitan Museum of Art. Examination of the Assyrian lotus patterns, as published by the various compendiums of the history of art, or by Owen Jones, will show that this treatment of the lotus bud is general in the Assyrian reliefs.



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31

The bulbous form of the bud of the rose-lotus and its resemblance to a tulip have been noticed by botanists, and are apparent to any one examining the plant. (The buds of the blue and white lotus have a more elongated form.) The sketch herewith at 31 was taken from nature in the lily-ponds at Bordentown, N. J., by Professor Frothingham. The naturalistic tendencies of Assyrian art are well known, and the hatched lines of the Assyrian reliefs may be safely supposed to imitate the appearance of the natural bud, as represented at 31. Professor Frothingham's interest in my theory, shown by his sketch, may be regarded as an indication that it is not repugnant to the present known facts of Assyrian science. There are Assyrian tile decorations in which the winged divinity holds the bud-shaped object facing a rosette, another case of lotus association according to the views presented in my last paper.

32

It may be urged, in the next place, that the different forms of the "Sacred Tree" are brought under a common explanation as to origin by the theory proposed. That certain "Sacred Trees" should represent combinations of fir-cones, as in 22, and that others should represent combinations of palms, is an unexplained and inexplicable state of affairs. Still more incongruous would be the association so commonly seen in Assyrian decoration, and represented at 32. Why fir-cones should spring from a palm-tree is not easy to understand. That lotus buds should spring from a lotus-palmette is easily understood. The representation of lotus buds in the branch figured at 26 appears to be a conclusive point, and it may be observed that a similar treatment of the lotus bud is occasionally found in Egyptian design.

It thus appears that the derivation of the Assyrian palmette from the Egyptian lotus-palmette is rendered probable by the close resemblance of the forms, by the precedence of the Egyptian motive in point of time, by the known direct relations of Egypt to Assyria under the eighteenth dynasty as a conquering power, by the dependence of the Assyrians on Egypto-Phœnician influence in ornament, and by the various considerations which substitute a relation of the lotus to solar worship, known to exist at once in Egypt, Phœnicia, and Assyria for an interpretation of the "Sacred Tree" without authority and without probability.

The sacred character of the lotus "tree" is illustrated by a series of ivory plaques in the British Museum which were probably inlaid decorations of furniture, possibly of a throne. One of these is shown at No. 33, an adorer before a lotus, which rises from the conventional form of lotus volutes and triangle explained in the matter

33

34

relating to the Ionic capital. The Egyptian style of this ivory plaque, which is probably of Phœnician manufacture, speaks for itself. It is from this series of Egyptianizing ivory plaques that the details are taken on which Mr. Clarke relied for his connecting link between the form of the Chigri capital and the form of the Assyrian palmette. A connecting link between these two forms of lotus-palmette it undoubtedly is.

It is clear that we are dealing with a motive analogous to 35. This motive is an Egyptian variant of designs like 5 and 13, and is taken from the metal designs of the Regulini-Galassi tomb. Thus the Ionic capital of Chigri (Neandreia), shown at 10 in the first article on the Ionic capital, takes its place among the forms of the lotus-Ionic, and is seen to be simply a variant of that aspect of the lotiform proto-Ionic already dealt with, in which the triangle between volutes is the distinguishing feature. One more of these latter motives is shown at 36, also from one of the Egyptianizing ivory plaques of Nineveh in the British Museum, in order to exhibit the contrast and unity of derivation which can be shown to exist within the limits of the lotus motive for the various forms of the proto-Ionic capital.

35

36

The development of the Greek anthemion will be found to bear out the position taken in this paper as to the Assyrian palmette. A reactive and secondary influence of the Assyrian palmette on the Greek anthemion may be readily conceded, but its supposed original relations with Assyrian art will be found to be unsubstantiated, and its connection with the Egyptian lotus-palmette will be demonstrated beyond peradventure.

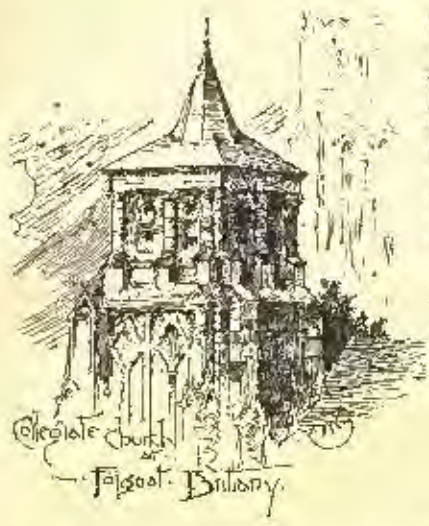
Wm. H. Goodyear.

[To be continued.]

The Corinth Canal.—The work of cutting through the Isthmus of Corinth is reported to suffer under the same financial difficulties as the Panama Canal work. A German technical journal states that when the subscription was opened for the carrying out of the scheme in 1882, estimated to cost thirty million francs, and to be finished in six years, the money was subscribed five times over. In 1887, however, this sum had been expended, and a further sum of thirty million francs was invited. However, up to the present only a third of this sum has been obtained, and if no further funds can be obtained the work on the canal will soon have to be stopped. Hitherto about two-thirds of the earthworks have been executed, but there still remains a great deal to be done, and it is now stated that as the canal will cost twice as much as originally estimated, no profits can be anticipated.—*The Builder.*

ITALIAN CITIES.—VI.

VERONA.—I.



ON the road to Milan and Venice, the most interesting city that is encountered, from the point-of-view of history and of art, is Verona, sitting on the banks of the Adige, which separates it into two unequal parts, the smallest of which is called Veronetta. The bridges serve to connect these two fragments of the city, which, with its ancient towers and crenellated walls garnished with loop-holes, preserves a monumental and severe aspect which at first sight recalls the physiognomy of towns of the Middle Ages. Through the mixture of sumptuousness and martial aspect, we understand why it was the seat of the power of the Scala family, the most illustrious member of which, Can Grande, has been justly called the Augustus of the Middle Ages, since he was the head of a veritable literary court, at which Dante, the grand Italian poet, and all the other illustrious men of the age rendezvoused. To-day Verona is dead, and its vast extent, so little proportioned to the reduced number of its population, contributes to impress upon it a painful air of desertion and irremediable decadence. The streets have needless width, and the squares are so vast that, as President Des Brosses said, there could be built in them entire villages.

The origin of this city is very obscure, but the most reasonable tradition is that which attributes its foundation to the Euganeans, a people which had its cradle in a group of grand and fertile mountains, whose silhouette shows itself a short distance beyond Padua, on the banks of the Bachiglione. About the second century it was already a flourishing city, and when it fell under the power of the Romans it did not long delay in acquiring municipal dignity. In 555 it became the capital of the Lombard Duchy, and under the successors of Charlemagne was the capital of the Lombard Kingdom. From this time dates the commencement of its real splendor. After having formed a part of the Lombard League against Barbarossa, it fell under the power of Ezzelino, whose tyranny and scoundrelism put to the blush the memories of the most cruel tyrants of Sicily. It next passed successively under the rule of the Scala, the Visconti of Milan and the Carrara of Padua; and finally, in 1405, it became a part of the possessions of the Republic of Venice, whose vicissitudes it followed. At different times it gave birth to men of universal fame — Catullus, Cornelius Nepos, and Pliny the Elder were born here, as well as Fracastor, who, in the sixteenth century, was a poet physician of much celebrity, author of a poem in three books, which the learned of former days delighted to consult. Scipio Maffei, another and more celebrated poet, author of the tragedy "Merope," was born here in 1713, as well as Pindemonte, a friend of Hugo Foscolo, toward the end of the last century, and Aleardo Aleardi, the romantic poet at the commencement of this century; but although all these names suffice to assure it unusual celebrity, their éclat is eclipsed by that of Paul Veronese, the grand painter of the Venetian school, who was the equal of the incomparable Titian in composition and design, and who would have surpassed him perhaps, if he had little more *fougue*, more warmth and more flash in his coloring.

Like all the cities which have played an important political rôle in Italy, and which in the Middle Ages gave an asylum to some of the feudal families who shared the power amongst themselves, Verona occupies an important place in the history of art. Roman domination left here visible traces in some of the monuments religiously preserved, especially the arena, which is assuredly one of the finest relics of antiquity. Later Verona found itself exactly at the point of junction of Byzantine and Gothic art, whose commingling gave birth to the Lombard style which from the foot of the Alps spread through the whole of Italy between the eighth and the eleventh centuries, undergoing during the progress the transformations which Italian genius impressed upon it in proportion as it penetrated farther into the depths of a nation always rebellious, in matters of art, against foreign importations. When, consequently, Italian Renaissance assured the triumph of an art essentially national in its characteristics, Verona lost much of its importance; but it had paid a sufficiently large tribute to the artistic progress of the nation and especially to architecture, for besides Falconetto, who is one of the most distinguished architects of the sixteenth century, it also saw the birth of Fra Giocondo, who built the bridge of Nôtre Dame at Paris, and Michel San-Michele, who died in 1559, whose brilliant career we will trace later on, and who disputes with the famous Palladio of Vicenza the title of the Vitruvius of his age.

The Austrian domination, entirely repressive and retardatory in its nature, prevented this interesting city from following the social progress realized in other civilized countries. Under the yoke of the foreigner, the Italian people was forced to vegetate in fear, without initiative, without impulse, and so long as the oppression to which it was subjected endured, it underwent a period of arrest, at the end of which almost the whole peninsula was found to be in the same condition as at the moment of its enthralment.

The history of the arts and especially of architecture gained, for it is due to this stagnation of Italian genius that we are able to discover in a great many Italian cities the original and characteristic physiognomy which they had in former times, and which now is rapidly beginning to disappear. Rome, for example, is becoming little by little unrecognizable, and the rage for transformation with which its municipal authorities are animated, and which is inspired, it must be confessed, by a very praiseworthy desire to beautify and renew, is exercised, nevertheless, in such a vehement and ill-considered manner that the relics of the past are sacrificed without pity, and the new aspect which is given to this great metropolis of the Christian world shocks the feelings of the cultivated and those of poetic sensibilities. It is almost the same in all the other great Italian cities where a need is felt of making good lost time and effacing the stamp of varied picturesqueness which the mighty ages of art have impressed upon it.

Placed outside the great currents of modern life, Verona has in many ways partly escaped this mournful municipal sickness, and its houses still preserve in part the sombre and at the same time gracious proportions which they had in the fifteenth century. In the chief streets we still see the long ranges of iron balconies projecting from the façades, whose too brownish color is relieved by the sparkle of the pots of flowers which garnish them. The marble pillars, the flower-filled windows, the arched doorways, certain façades still embellished with fresco, degraded by age and bad weather, and the magnificent tombs of the Scaligers, which are to be found right in mid-street, all recall to the imagination those agitated times when civil discords and feudal quarrels soaked the soil of Italy with human blood; when the cares of cultivated men were divided between love and war, and the patrician went out by night with a rope-ladder in one hand and a poniard in the other to renew his oaths of fidelity at the feet of the lady of his thoughts. Involuntarily one thinks of the terrible hatreds of the Capulets and Montagues, who divided Verona into two factions always armed one against the other, whose tragic denouement, real or imaginary, suggested to Shakespeare the subject of his immortal drama. The fame of Romeo and Juliet still lingers persistently amongst the Veronese, and the young girls cannot mention this unfortunate heroine without tears in their eyes. It is on this account that one must be somewhat on his guard against local legends, which popular faith, joined with a spirit of speculation, has invented and fixed tenaciously upon certain monuments which people seek to attach to the cult of Juliet. It is well, also, to apply this feeling of distrust wherever one travels in Italy to almost all the monumental relics which the rapacity of local showmen has nearly succeeded in uniting with the fame and reputations of illustrious persons. We are shown for example at Florence, near the cathedral, the stone upon which Dante used to sit and dream before his exile; and at Ferrara a guide conducts the traveller into the cell which served as Tasso's prison. Now, recent studies have shown that the author of "*Jerusalem Delivered*" was never persecuted at the courts of the Dukes of Este, that his captivity is a fable, and that at the time when he lived this famous *cachot* was not even built at Verona. We are shown, also, in the street of San Sebastiano, and not far from the Giusti Palace, celebrated for its garden labyrinth, the house where, according to tradition, Juliet was born, as also an inscription declares. It is a heavy, commonplace looking building, provided with two balconies, and possesses no particular character, except the probably unmerited honor which is attributed to it of having been the birthplace of Romeo's sweetheart. At the side of the Rue des Capucins, near the banks of the Adige, the guides point out an old sarcophagus as the tomb of Juliet. This is found at the bottom of a garden, and the structure upon which it rests is carefully enclosed by a wire grating. Here, also, one must preserve a grain of scepticism, although the walls are covered with *ex voto* offerings and precious souvenirs of every kind, which lackadaisical young women and especially young English misses, have consecrated to the shade of this child martyr. There was a time when the sarcophagus, which had had the glory of receiving these august remains, was considered to be a talisman: the Archduchess Maria Louisa caused a necklace and bracelet to be set with the red stone of which it is built, and the prettiest women in Verona considered it an honor to carry charms made of this same red stone fashioned like a little sarcophagus; but in 1826 the peasants of the neighborhood very prosaically washed their lettuce in this red basin, which, indeed, from the form in which it is fashioned proves that it was really intended for a more every-day use than that which is attributed to it by the ignorant common people.

The tombs of the Scaligers in the Cemetery of Santa Maria Antica have at least the merit of being authentic. We designate under the title of Scaliger the dynasty of the Princes della Scala, who reigned at Verona for 128 years, from 1259 to 1388, whose history is a mixture of vices and virtues, of crimes and mighty deeds,

[1] Continued from page 122, No. 664.

very common to the princes of that time, forced for the most part to degrade their spirit to the level of the brutal and villainous passions of their contemporaries.

Mastino I, founder of the dynasty, was killed in 1277. After his death, people held as ruler, his brother Albert, who had the good fortune to die a natural death in 1301. Three of his children, Bartolomeo, Alboino and Can Grande, ruled in succession. Bartolomeo remained three years in power, and it was under his reign that Dante first came to Verona. He also died in his bed — a rare thing in that family. Alboino ruled only under the direction of his brother. He was frail and sickly by nature, and after the death of Bartolomeo, Can Grande found himself in tenth lord of Verona. This man was a magnificent and ambitious noble, who became in a short time the leader of the Ghibelline party in upper Italy. He extended the dominion of Verona over a great portion of Venetia. An infectious fever carried him off in three days. Can Grande II, who succeeded him, found himself at odds with the two sons of Alboino and with another of his nephews, who disputed the throne with him. He succeeded in defeating the conspiracy, but having manifested his intention of passing his sceptre to the hands of his natural son, because he had no legitimate children, he was pniarded by Cansignorio, his second brother, who desired to rule after him, and who, to enjoy in peace the fruits of his crime, caused to be imprisoned at Peschiera and finally strangled his brother Pietro, who would have been able in his turn to dispute the throne. In spite of this double fratricide Cansignorio was in the main a virtuous prince. He avoided war, and did everything in his power to aggrandize the power and prosperity of Verona. It was the fashion of the times; each one wished to be an Augustus or a Marcus Aurelius, but he always began by smoothing the path to the throne by every possible means, even if they were criminal. The two natural sons of Cansignorio, Bartolomeo and Antonio, were the last fruits borne by this dynasty, which, having its birth in crime, perished in blood. Antonio, in order to rule undisputed, cut the throat of his brother Bartolomeo, was himself dethroned in 1387, and died by poison a year afterwards.

These are the men to whom the Middle Ages in Italy reared altars and erected monuments. In the tombs of the Scaligers have been successively deposited the ashes of nine members of this dynasty of the Atrides. The sarcophagi are enclosed by a very beautiful wrought-iron screen; but the most interesting for those who study history and architecture is that of Can Grande, which dominates the others, and has a truly monumental air. It is a sepulchre built after the funerary style held in honor in upper Italy and which differs sensibly from that which at almost the same time flourished in central Italy and especially in Tuscany. In his masterly study on Donatello, M. Eugene Müntz very clearly and justly characterizes the difference between these two schools; and it is from him that I borrow this definition. He very justly remarks that of the two principal types of funerary monuments obtaining in Italy during the Middle Ages one is the mausoleum planted against the wall, which consists only of a façade more or less richly decorated, and of which Tuscany can claim the invention. Arnolfo di Cambio, a Florentine, created the formula for this kind of monument during the last years of the fourteenth century in the tomb of the Cardinal de Braylus. The other is a mausoleum isolated on all sides and containing under a kind of baldachino a sarcophagus with the couchant figure of the departed, and upon its summit another statue of the same person, most frequently on horseback. This original conception finds its most eloquent expression in the tombs of the Scaligers, but we also meet it in the tombs of the Visconti at Pavia and at Milan, and King Louis XII of France introduced it in the tomb which he caused to be erected at St. Denis.

At the top of the tomb of Cansignorio stands the equestrian figure of Can, whose image is also reproduced on the sarcophagus below. The body of the monument, which affects the pyramidal form, is a mass of niches and pinnacles peopled with statues supported by columns and colonnettes which enhance the exaggerated luxuriance of ornamentation. All the complications known to art have been here united to contribute to the splendor of the work, which, nevertheless, bears the stamp of the primitive Gothic school immeasurably heavy and unhealthy, such as the North invented, and such as we find it in Italy before the genius of local art rejuvenated it and gave it that gay and inspiriting expression which we find in the monuments of a later day.

H. Merel.

NOTES & CLIPPINGS

Whistler and the Royal Society.—Mr. Whistler and the Royal Society of British Artists have been fighting, it would appear, about a lion and a butterfly. Mr. Whistler drew a golden lion on the Society's notice board, and appended a butterfly, *more suo*, as his emblem. According to the president of the Society, the design was made in spurious gold leaf, and began to tarnish to a dirty brown, whereupon the Society regilded the lion and effaced the butterfly. The *Times* has been publishing quite a lively correspondence on the subject; but unless Mr. Whistler's pen has lost its cunning, the British Artists will probably find the task of breaking his butterfly a little harder than their president seems to imagine. Of course the sympathies of the self-respecting artist will be with Mr. Whistler. The Society might easily have painted a fresh notice board, and had they sold the old one—with the butterfly on it—they would have made money by the transaction.—*St. James's Budget.*

Elastic Sandstone.—What is known as itacolumite, or elastic sandstone, is found in California, Georgia, and other localities in the United States, and a whole mountain of it, it is stated, exists in Southern Nevada, a short distance east of Death Valley. Itacolumite is nearly always to be met with in regions producing the diamond, and is the reputed matrix of that gem. A piece of this elastic sandstone, about 6 inches long, 1 inch wide and ½ inch thick, is in the possession of the *Mining and Scientific Press* (San Francisco), which is as flexible as a piece of India-rubber. Another piece, 13 inches long, 2 1-2 inches wide, and 1-3 inch thick, is in the office of the acting chief clerk of the United States War Department, Washington, and said to possess equal flexibility, but being, without doubt, a genuine stone. No practical use has as yet been made of the stone, but it would appear to be useful for elastic foundations for machinery, to prevent vibration, such as are now being introduced in America. At any rate, it is a geological curiosity.—*The Builder.*

TRADE SURVEYS

Advices recently received from quite a number of manufacturing and building centres go to show that there will be very little if any serious trouble with wage-workers during the season. In some quarters fears are expressed, but they are not well-founded. There is a disposition among workmen always to strike if advantages can be obtained, but at the present time there is a feeling among both leaders and the membership that this is not the right time, and that present contracts had better be executed. The only important movement on foot is pushed by the Amalgamated Iron and Steel-workers to shut down the rolling-mills of the country for two months during the summer, as do the glass-workers. The glass industry has adapted itself to this annual suspension, and feels no bad effects. The iron-makers do not wish to suspend work for two months, and if they were in a position to resist they would undoubtedly do so. As it is, their organization ceased to exist a year ago. The workmen will probably have the matter their own way. It is scarcely probable this movement will extend to other industries, although it is well known that in a good many branches of trade workmen would welcome a few weeks suspension during the summer; especially those who are able to afford it. In the building trades there is very little discontent. A careful inquiry throughout the West, where there is the most danger to be apprehended, shows that the arrangements made for the early spring will be continued throughout the season. Further inquiry develops the fact that quite an organized effort will be made next spring to reduce the hours of labor. Many of the leaders among American workmen who have held aloof from this movement, have recently expressed their willingness to give it their sanction. A trial will probably be made. The better industrial conditions in foreign markets have not as yet apparently reduced the outflow of labor, as much of it comes from agricultural regions where ordinary industrial conditions do not influence movements. It is probable that next year fewer emigrants will come from the larger cities and towns of Great Britain and the Continent. There is in general more employment and better pay. The workmen prefer to remain at home where there is work for them, as the fact is becoming more and more apparent to them that the apparent advantages of higher wages in America are off-set largely by the increased cost of living. The dulness which has existed in the industries engaged in iron-making still continues. Manufacturers, jobbers and financiers, railroad managers and all others are anxiously awaiting the word "Go." It may not be given for some time to come. Perhaps never was there as much confidence in future activity as at this time. Reasons for it are not always clear; but, nevertheless, there is a very wide spread and general confidence that the summer will not pass till the mills and factories of the countries are booming with work.

There is a large volume of money seeking employment in all new enterprises, and promoters have been encouraged by investors to push out in a good many new directions. Out of the new enterprises reported in the South, about one-third of them are false alarms. Nevertheless, there is a great activity. A kind of land speculation is in progress there, and it has been stimulated recently by the heavy purchases of lumber manufacturers, iron-makers and coal-miners. Only this week a very large delegation of capitalists are passing through the West Virginia coal regions with a view of deciding upon purchasing several large tracts of land which have been on the market for some time. There are several very important schemes under way for the improvement of inland navigation and the construction of canals which will compete with railroads. Just what shape these schemes will take it is impossible to say. Among the schemes contemplated is the slack-watering of a portion of the Ohio, also of the Allegheny, and the slack-watering of some small streams in the West. There is a plan afoot for the construction of a canal from the Ohio River to Lake Erie, and for an inland canal for several hundred miles along the Atlantic Coast. Besides this, there are important irrigating schemes in the far West, and grand schemes looking to the establishment of manufacturing sites and manufacturing facilities for the Pacific Coast north of San Francisco. These rumors are all encouraging, and show that the moneyed men and the enterprise of the country are only awaiting a favorable opportunity. Meanwhile, reports from builders in the large cities and small towns show that house-building was never more active than it is so far in 1889. Very large contracts have recently been closed for lumber in lumber centres in Arkansas and in the Gulf States. An upward tendency in prices is looked for. No such tendency is manifested in iron. Prices have not been weakened in the iron trade, although pressure in that direction is very strong. The rail-mills are craving for business, but the railroad-builders are slow to give it. The anthracite coal trade is considerably broken up, and the buyers are endeavoring to keep clear of the market, hoping that the anxiety of the miners will force them into making a concession. This week Lake navigation opens up, but this will not help trade much. Some two hundred miles of road are to be built this year in the State of Pennsylvania to develop coal, iron and timber lands. Another effort will shortly be made to build the South Pennsylvania Road. Railroad-builders have plans completed for a vast amount of work, but are waiting for more propitious indications. The Interstate Commerce Commission is making excellent headway in the extremely difficult problems placed in their hands. It has a few score decisions to make — enough to tax the strength of intellectual giants.

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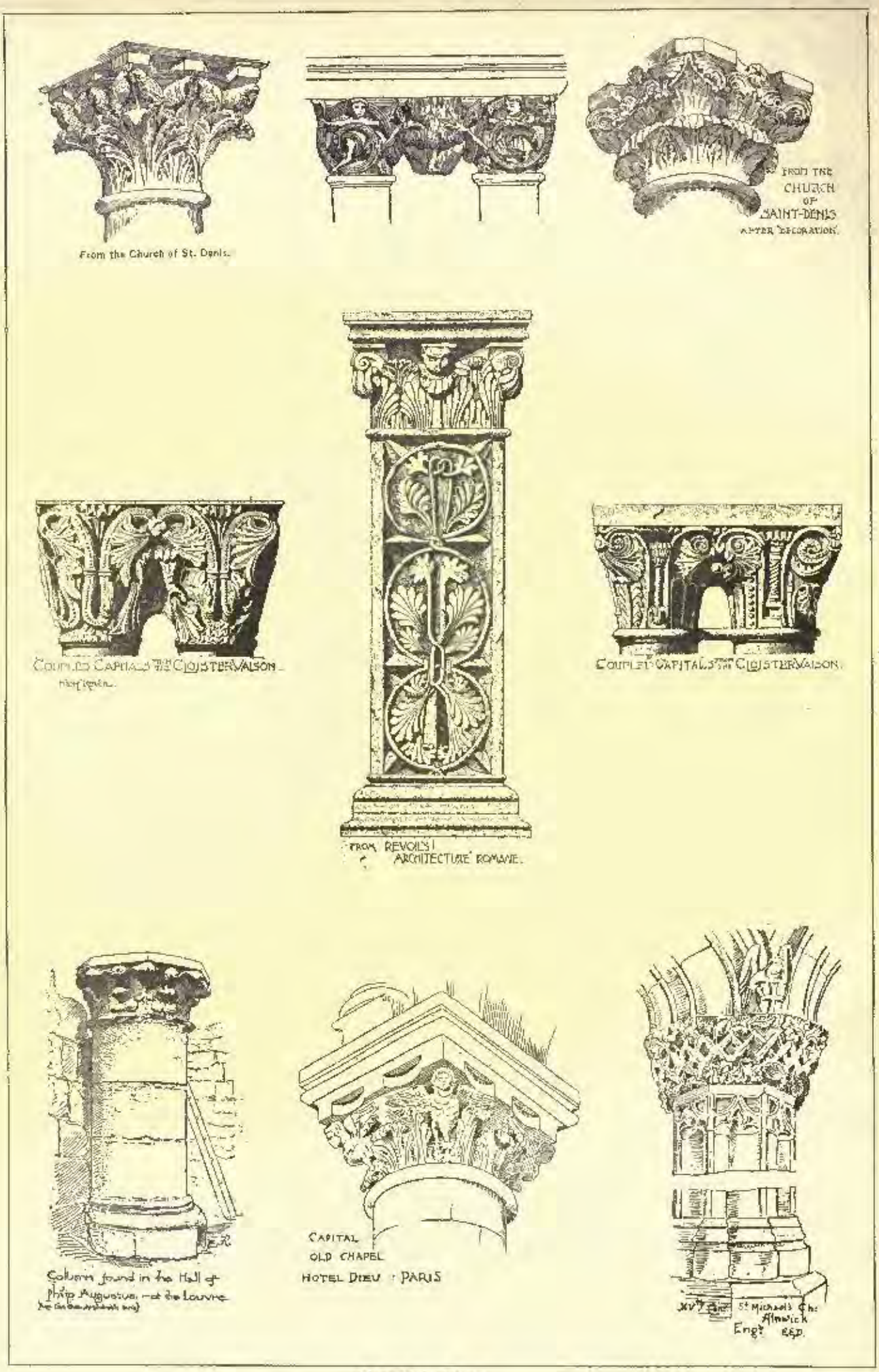

From the Church of St. Denis.
FROM THE CHURCH OF SAINT-DENIS AFTER DECORATION.
COUPLED CAPITALS FROM THE CLOISTER VAISON
FROM REVOIL'S ARCHITECTURE ROMANE.
COUPLED CAPITALS FROM THE CLOISTER VAISON.
Column found in the Hall of Philip Augustus, not the Louvre
CAPITAL OLD CHAPEL HOTEL DIEU : PARIS
St Michael's Ch: Alnwick
Engd. E.E.D.

CAPITALS.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

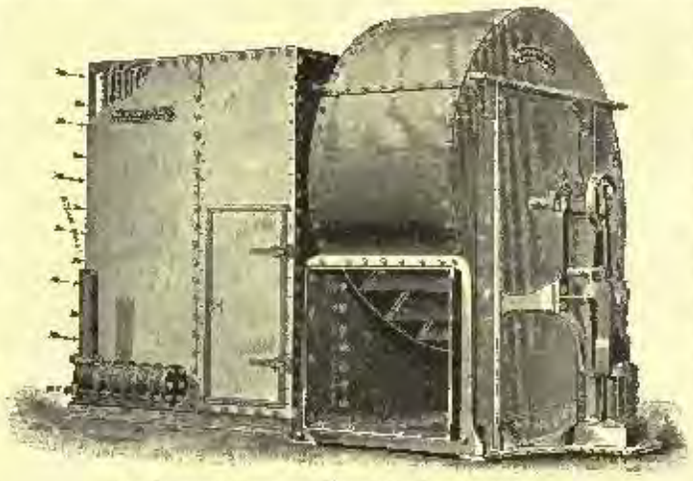
No. 82. SATURDAY, APRIL 6, 1889. Volume XXV No. 698.

THE STURTEVANT SYSTEM OF HEATING AND VENTILATING.

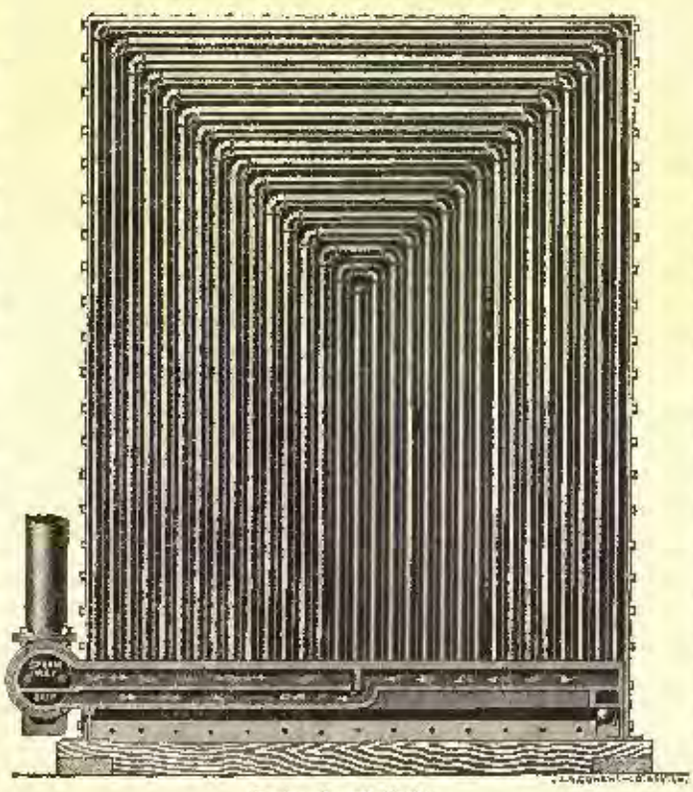
The necessity of mechanical ventilation in all cases where positive action is required is becoming more and more keenly felt every day. Particularly in this vicinity, has the discussion of the new Suffolk County Court-House and the condition of our public school-buildings brought the subject into prominence.

The only accepted and economic means of mechanically ventilating is the fan. If, in conjunction with the fan and ventilating system, the heating system can also be operated, there is not only a marked saving in expense, but a combined system is formed which heats and ventilates with the maximum of efficiency. It has been the common practice among many architects and contractors to purchase the fan of one party, the heater of another, the engine of another, and so on. To meet the requirements, and, at the same time, reduce the cost to a minimum, this house has for years manufactured what is known as the Sturtevant Steam Hot-Blast Apparatus. This line of manufacture was started nearly a quarter of a century ago, and since that time over five thousand of these apparatuses have been sold. They are now to be found in use in buildings of all classes, from the machine-shop and foundry to the largest and finest public buildings, theatres, etc.

Radical changes have very recently been made in the entire apparatus, and it is now presented in the improved form, as shown in the accompanying cuts. The small cut represents the apparatus complete. It consists in its several parts of a steel pipe steam-heater (shown in larger scale herewith), a fan, and an engine. The heater is constructed upon a series of cast-iron sectional bases, into which are screwed vertical rows of steel pipe, connected at the top by cross-pipes. The course of the steam is clearly shown, the steam inlet and drips being in the same header connecting with the series of sections. The fan is specially designed for handling large volumes of air at a minimum expenditure of power. It is lightly but strongly built of steel plate, and stiffly braced. The engine is of the best type, embodying the results of years of experience in fan-propulsion, and is capable of continuous running at high speed. When desired, the fan may be driven by belt from an independent engine.



The Sturtevant Improved Steam Hot-Blast Apparatus.



Section through Heater.

The outlet of the fan may be connected with a duct communicating with the branches or flues to the various rooms. The admission of warm air to these rooms is regulated by registers or by dampers in the flues. The peculiar advantages of this system consist in the much reduced amount of heating-surface required, the positive and absolute ventilation and heating of the apartments, the removal of all the steam-pipes from the rooms, and the placing of the control of the entire system in the hands of a single person.

It is adaptable to all classes of buildings, and this house is prepared to put in complete ventilating and heating plants, comprising boilers, engine, heating and ventilating apparatus, return-water apparatus, flues, registers, etc. A very complete and comprehensive description of this system is contained in a large eighty-page, illustrated "*Treatise on Ventilation and Heating*" issued by this house. A copy will be mailed upon application.

B. F. STURTEVANT,
BOSTON, MASS.

RUBBER GOODS.

The New York Belting and Packing Company, New York, enjoy the reputation of making the finest mechanical rubber goods in the world, and also the rare faculty of knowing just how to let the public become aware of it, through liberal and judicious advertising and capable, energetic representatives. Their latest lucky stroke is in having secured as their Southeastern agents the Atlanta Rubber Company, of Atlanta, Ga., who conduct the only jobbing business in rubber goods in the entire Southeast. This firm will carry at Atlanta a very large stock and complete assortment of the New York Belting and Packing Company's vulcanized rubber goods, from which orders can be filled without an hour's delay — a fact of interest to every one who handles or sells mechanical rubber goods in the Southeast. During their existence of some six years they have built up an excellent name for square-dealing, careful and prompt attention to orders and business courtesy. The New York Belting and

Packing Company is to be congratulated in securing their services, as the New South is fast developing its manufactures, and will constantly demand more and better supplies of this kind, and no one is in a better position to advance their interests in this territory, than these new agents.

NEW YORK BELTING AND PACKING CO.
15 Park Row, New York.

TIMBY'S LATEST AUTOMATIC LOCK.

FOR SINGLE-SASH WINDOWS AND DUMB-WAITER DOORS.

In response to numerous calls from architects and builders, as well as private individuals that contemplate erecting dwellings or business blocks during the coming season whose plans and specifications call for single-sash windows, this lock has been specially designed and placed upon the market.

There are many reasons why the heavy oak or other hard-wood single sash, are being substituted for soft-wood double sash for windows in many of the costly blocks, and residences now in process of construction in different parts of the country. Everything considered the single sash makes a very handsome and desirable window and the number used is rapidly increasing. But the question of a suitable locking device for such sash has been a puzzler. From amongst all the "centre sash fasts" in the market, and their name is legion, not one can be selected that can be applied to a single-sash window, or a lifting dumb-waiter door. It must be admitted that it is just as essential that a window should be locked, as that a door should be, and while it is important that the lock used should be strong, and substantial, it is of the highest importance that it should be automatic in its action, locking the sash securely when closed, and just as securely when open for ventilation, or other purposes.

The "Timby" Single Sash Automatic Lock, accomplishes all that can be desired in this direction.

It is a mortise lock, entirely novel in construction, extremely simple in all its parts, applicable to any window, perfectly automatic in its action and when set in the stile of the frame, and the sash adjusted in position, all that remains in sight is the operating device upon the face of the inside stop bead.

The accompanying illustration represents a section of window frame with the lock applied to the left-hand stile.

The positive automatic action of the bolt, makes it simply impossible to raise a sash from the outside two or four inches, when the same has been left slightly open by the carelessness of servants, or others or for purposes of ventilation. If by the accumulation of ice or snow under a sash it cannot be perfectly closed, and the bolt does not enter the socket in the sash, should a person from without attempt to raise it, the bolt would automatically enter the next socket, and prevent the possibility of raising the sash farther.

The sockets in the edge of the sash are provided with heavy metal plates, or bearings, secured in proper position at different points by screws. The heavy bolt of the lock is projected automatically into the same, thus locking the sash at different points of adjustment.

Particular attention is invited to the great strength of all the component parts of this lock. Its wonderful simplicity, and ready adjustability to any window, the bolt being of sufficient strength to withstand more than a thousand pounds pressure. The mechanism of the operating device is novel in the extreme; externally, the appearance is simply that of a thumb-nut, resting upon a plate beneath.

Suspended from the extreme inner top of the thumb-nut is an adjustable lever extending downward within the walls of the nut, and far enough below the plane of the face-plate to admit of an adjustable connection with the extended arm of the lock proper. The rocking, or semi-rotary motion of the bolt arm, sufficient to withdraw the bolt from the socket, and thereby release the sash is produced by sliding the thumb-nut downward, which, having a leverage of nearly two inches, the greatest possible ease of operation is assured. This new lock is a recent invention of Mr. T. F. Timby of Bronklyn, N. Y., but it is a separate and distinct invention from the burglar-proof sash-lock and ventilator.

Three different sizes of this new lock is manufactured. No. 1, being for the heaviest hard-wood single sash. No. 2, for medium weight. No. 3, for dumb-waiter doors and ordinary single or double sash windows.

Descriptive circulars and price list of this new lock may be had by addressing the manufacturer,

J. C. JENKINS,
Oswego, New York,
or T. F. Timby, manager of the New York City Office, 102 Chambers Street, New York City.

ELECTRIC TIME SYSTEM FOR PUBLIC BUILDINGS.

Architects are without doubt aware of the growing demand for a good system of Electric Time for Public Buildings and Factories.

The "Warner" system, supplied by the Standard Electric Time Company, of New Haven, Conn., meets this demand in a most satisfactory manner and has attained an enviable reputation for good and reliable service wherever it has been used.

In this system a switch-board is used by means of which the secondary or electric clocks are all controlled from a central point, whether the circuit is confined to one building or extends to all parts of a large manufacturing establishment covering acres of ground. The switch-board shown in the cut is of the pattern used when the system is run from a tower clock, as is often done. It contains an electric gauge of simple construction which shows the condition of the battery at a glance and a small indicator clock which always shows the condition of the secondary clocks throughout the circuit. An alarm-bell is also attached which gives immediate warning in case the service fails from any cause, whether failure of the battery or breaking of the circuit wires.

When it is desired to use a regulator as the master-clock this company furnishes a fine self-winding regulator with the switch-board system inclosed in its case. In this way no care is necessary except to replenish the batteries once in twelve to eighteen months, as the alarm-bell will call attention to it in case anything goes wrong.

This system of time is used by the N. Y., N. H., & H. R. R. Co., and many others, and has never failed to give complete satisfaction. In cost it will compare favorably with any electric clocks ever offered to the public and is considerably less than any other system capable of giving even fairly good service.

THE STANDARD ELECTRIC TIME CO.,
New Haven, Conn.

REMOVAL.

On or about May 1, 1889, I shall remove my business to 43 Beekman Street, a much more commodious and desirable place than that which I now occupy.

I desire to thank my friends and customers for their past favors, and take pleasure in stating that it is due to their patronage in part that I am now enabled to secure a more desirable place of business.

As heretofore, I shall take pleasure in giving personal attention to all work entrusted to my care, and in my new place shall be able to show the different sanitary appliances which I am now having manufactured at a better advantage. After June I shall be able to show all the standard closets of first quality in operation in my store, and shall keep on hand a full line of plumbing fixtures.

All material sold and all work done by me will be guaranteed.

LEONARD D. HOSFORD,
43 Beekman Street, New York.

NOTES.

The Whittier Machine Company have recently put into the building of Messrs. George C. Goodwin & Co., on Hanover Street, Boston, a belt elevator for freight service.

All Saints' Church, Richmond, Va., from plans by M. J. Dimmock, architect, has recently been finished and dedicated. This church has been entirely decorated and furnished by Messrs. J. & R. Lamb, of New York. Their work includes all of the stained-glass windows, the color decoration of the walls, and all the chancel furniture in carved oak. The result obtained is very consistent and harmonious.

Messrs. Somers, Lindeman & Co. have such faith in their liquid-filler, the "Lindeman," that they are willing to sell it to responsible parties, subject to their approval. It obviates the necessity of rubbing off—an expensive and laborious task. It is an excellent substitute for white shellac. It can be used on the lightest wood without discoloring it; it is entirely transparent; hence does not cover up the finest figures of the wood; it effectually prevents suction or absorption. On ordinary close-grained woods, one coat of *Liquid-Filler* and one coat of varnish will make an excellent finish, presenting sufficient body on which to rub.

The attention of manufacturers, importers and dealers in building materials and appliances is invited to the advertisement of Bicknell's Advertising Bureau in another column. Mr. A. J. Bicknell's long experience and connection with the architectural and building trades as a publisher and advertiser is a guarantee of his knowledge of the mediums best suited to the introduction and sale of the various articles that enter into the construction and finish of buildings. In the establishing of this Bureau, Mr. Bicknell takes the position of not confining himself to the interests of any one publication, but of placing the business of his patrons where the result will be most satisfactory.

THE SANITAS MANUFACTURING COMPANY.

SANITAS SINK AND FLUSH-POT.

This new device has successfully solved the problem of the disposal of kitchen and pantry waste-water.

It is absolutely automatic in its action, and to this feature is largely due its great success.

It is so constructed that it must always do its work correctly and completely, and it *cannot be made to do otherwise*, even by the greatest ignorance or neglect on the part of the user. It operates on the principle of the intermittent automatic flush-tank, keeps the waste-pipes clean and obviates the necessity of using a grease-trap. It is provided with an accessible seal-retaining trap constructed on the principle of the Sanitas Trap, and is altogether the only complete sanitary kitchen-sink ever offered to the public.

One of the most difficult problems in sanitary plumbing is the disposal of kitchen-waste. The fatty substances dissolved in the hot-water of dish-washing are in ordinary kitchen-sinks discharged into the waste-pipes, where they quickly congeal and clog them. To overcome this difficulty innumerable devices have been invented, but hitherto without success.

Large pot-traps have been used under the sink with the view to collecting the grease before it entered the main waste-pipes. But these traps require constant attention to remove the accumulating filth at suitable intervals, and as there is nothing in their mechanism to remind the servant when they require emptying, and as the emptying is an extremely offensive operation owing to the putrid condition of the contents of the trap, the work is neglected and the waste-pipes become obstructed as much as if no pot-trap existed. Moreover, the trap must, on account of its weight, be placed on or below the floor, leaving a considerable length of pipe between it and the sink outlet to be clogged.

Large grease-traps have been used, but they are open to the same serious objections as the pot-traps, and utterly fail to solve the problem.

Flush-pots, with ordinary outlet-plugs, have been tried. But as the outlets must necessarily be operated by the persons who use the sink, it is found that sooner or later they are improperly used, and then greater objections than ever result.

Any simple plug-outlet in kitchen-sinks offers a tempting waste receptacle for solid refuse which an ignorant servant is certain to scrape into it to avoid the trouble of their proper removal; and even with the greatest care there is nothing to prevent the accidental passage of solid matters sufficient to clog the trap through this outlet, particularly where the strainer is movable, and in practice this is what is found to occur.

It was for the purpose of avoiding these objections that the Sanitas Kitchen-Sink was invented.

It has been assumed at the outset as an indispensable condition in the design of the apparatus, that absolutely nothing should be dependent upon the intelligence and care of the servant, and that by no possibility could the waste-passages become clogged either by accident or by design. In short, that the operation should be entirely automatic, and that the form of the outlet should be such that no solid refuse *could possibly gain access to it.*

These results have been obtained in the Sanitas Sink as follows:

The general form of sink and flush-pot, designed by the well-known sanitary engineer, William Paul Gerhard, has been adopted as a basis. It consists of the combination of a square flush-pot, with an ordinary kitchen-sink, in such a manner as to provide a sink of the ordinary appearance and form alone, but having a deep portion or flush-pot at the end. This deep portion is partly covered with a strainer, and the waste-water is discharged through a stand-pipe overflow and outlet-plug, preferably the "Sanitas" waste.

Mr. Gerhard's sink is an improvement on Colonel George E. Waring, Jr's. flush-pot, in being more convenient in form and arrangement, and hence less liable to improper usage than the latter. But neither possesses the all-important requisite of automatic action.

It remained for Mr. William E. Hoyt to suggest the use of an automatic discharge in connection with the Gerhard Sink and for Mr. J. P. Putnam to embody the suggestion in practical form in the Sanitas Sink. Thus the Sanitas Kitchen-Sink is the creation of four competent sanitarians, and its construction and operation are worthy of its parentage.

Figure 1 represents a perspective view. Figure 2 a plan and Figure 3 a section of the Sanitas Kitchen-Sink. The Flush-Pot of Gerhard is retained except that the upper or horizontal strainer covers the entire pot and is hinged to one end of the sink so that it may be opened when it is desired to use the deep part of the sink. Instead of a stand-pipe discharge however, a siphon discharge is used, and a vertical strainer is interposed between the flush-pot and its siphon. The short arm of the siphon is trapped with a seal-retaining trap of the Sanitas-trap principle just behind the vertical strainer. This strainer slides upwards in a groove to give access to the trap when desired, but closes again automatically by its own weight as soon as released. Clean-out openings are provided at the trap and wier chamber and give access to every part of the waste system. No bones and solid refuse can be scraped into the discharge outlet and dropped into the waste-pipe, because this pipe ascends instead of descends at the outlet and should the trap be clogged, it will simply cause the water to cease to flow out until the obstruction is removed, which can easily be done by simply raising the lower strainer and lifting out the obstruction by hand.

The operation of the Sanitas Kitchen-Sink and Flush-Pot is as follows: The sink is used in the ordinary manner until the flush pot fills to the height of the siphon overflow. When this point has been reached the next discharge of a quart or two of water from the washing-pan charges the siphon and causes the entire contents of the flush pot to rush out through the waste passages filling them full bore and scouring them from end to end. The solid matter and lumps of grease will be left on the bottom of the flush-pot and must be removed by the servant in the proper manner, inasmuch as they cannot possibly be removed in any other manner.

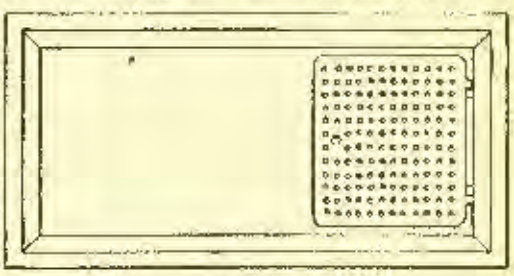


Fig. 2.

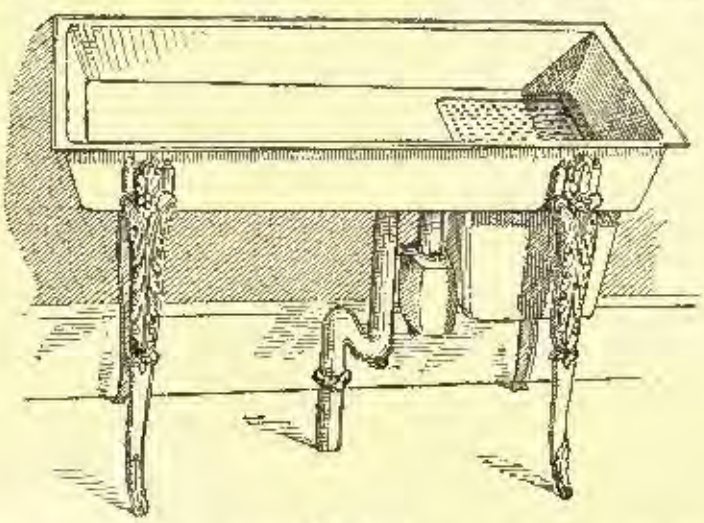


Fig. 1.

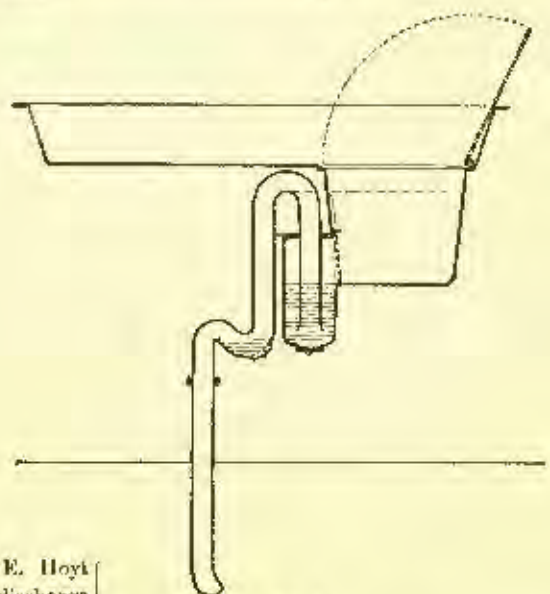


Fig. 3.

Thus by the use of the Sanitas Sink and Flush-Pot all the great annoyances, expenses and dangers arising from the discharge of sink refuse are completely avoided. Moreover, the Sanitas Sink is in most cases much more economical than any other. The Sanitas Flush-Pot is entirely constructed of iron, and is of simple form. The additional cost of the actual flushing apparatus over that of an ordinary kitchen sink is trifling. But the sink contains its own trap and the cost of trapping is avoided rendering the sink really no more expensive than an ordinary sink and trap. The Sanitas sink trap is also antisiphonic and hence requires no back-venting in which case the use of the Sanitas Sink and Flush-Pot is considerably cheaper than that of any ordinary sink.

The Sanitas Flush-Pot is designed for use

TORREY, BRIGHT & CAPEN,

IMPORTERS AND DEALERS IN

FINE CARPETS

AND ORIENTAL RUGS.

348 AND 350 WASHINGTON ST.,

BOSTON.

A. H. DAVENPORT,

96 WASHINGTON ST., BOSTON.

932 BROADWAY, NEW YORK.

Furniture and Wood Work

MADE TO ORDER.

Rare Stuffs for Drapery and Coverings.

E. B. BADGER & SON,

COPPERSMITHS

And Manufacturers of

METAL CORNICES,

WINDOWS, SKYLIGHTS, ETC.

Metal Work on Athletic Building done by E. B. Badger & Son.

WILLIAM LUMB & CO.,

PLUMBERS

15 PROVINCE ST., AND 9 CHAPMAN PL.,

WILLIAM LUMB. BOSTON. WM. H. MITCHELL.

either with ordinary iron, soapstone, wooden, or any other form of sink, and is sold either alone or in combination with an iron sink body especially cut out to receive the flush-pot, as shown in the figures already referred to.

DIRECTION FOR SETTING.

The Sanitas Kitchen-Sink and Flush-Pot are set just as any sink, except that no trap is needed, a seal-retaining trap of the best and most scientific form being constructed in the apparatus itself. This trap has the very great advantage of being directly accessible from the flush-pot of the sink without the removal of so much as a screw. The trap, moreover, being anti-siphonic, requires no venting, and this expense may be avoided. The trap may be vented, however, if desired, like any other trap, in which case the vent-pipe should be taken from the lead waste-pipe just beyond the wier chamber, or at the bend of the floor, as is usual in back-venting kitchen-sink traps. But such trap-venting decreases the rapidity of the discharge of waste-water and its consequent flushing effect as much as thirty per cent, and it is to be condemned as an expensive and useless complication.

The discharge-pipe below the siphon should have as quick a fall and as much of a fall as

G. W. & F. SMITH IRON CO.,

Building Iron Work

OFFICE, 411 FEDERAL ST.,

BOSTON.

JOHN Y. MAINLAND,

Carpenter and Builder

164 DEVONSHIRE STREET,

BOSTON, MASS.

WALTER McCREARY. JOHN D. NOYES.

McCREARY & NOYES,

HOUSE, SIGN AND DECORATIVE

Painters & Glaziers

HARD WOOD FINISHING AND POLISHING.

9 LIME STREET, *Off Kilby,* BOSTON, MASS.

Residence, Fairview Street, Roslindale.

JAMES M. RILEY,

Formerly H. Riley & Son, Established in 1841.

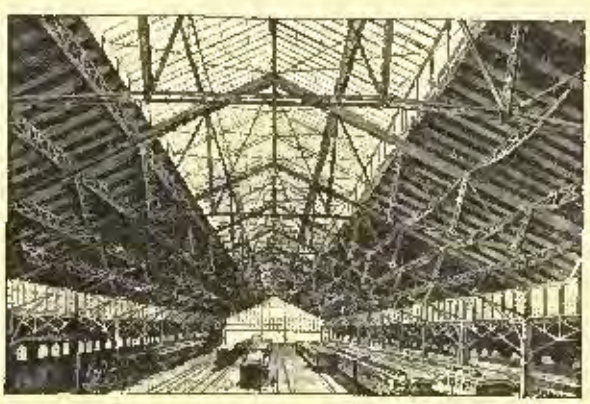
Slate, Metal and Composition Roofer.

Personal Attention given to Repairs, etc.

OFFICE: 164 DEVONSHIRE ST., BOSTON.

Master Builders' Association.

THE HELLIWELL PATENT GLASS ROOFS.



possible, in order to increase the rapidity of the discharge of the flush-pot and its consequent scouring action. It is best to use a 1½ inch or 1¾ inch pipe for several feet below the siphon, since a small pipe fills "full bore" easier than a larger one. At the end of the perpendicular fall the 1½ or 1¾ pipe may enter a two-inch pipe.

When soapstone or earthenware is preferred for the sink, the Sanitas Flush-Pot is provided with a wide flange, in order that the screws securing it to the soapstone may be placed at some distance from the edge of the latter for greater strength.

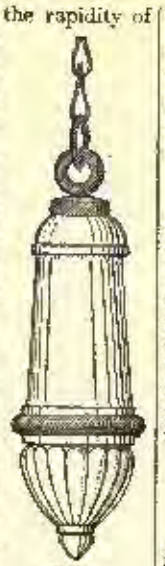


Fig. 4.

The flush-pot is set with such a sink as follows: A square opening is cut in the bottom of the sink of the size and form of the inside of the top of the flush-pot, and tapped to receive the bolts of the latter. The flush-pot is then bolted to the under-side of the soapstone with the bolts furnished with the flush-pot.

THE SANITAS OPAL-PULL.

Figure 4 illustrates the Sanitas Pull. This is undeniably the most ornamental and durable pull on the market. Having the texture and pure white color of the earthenware of the closet and other plumbing fixtures, it harmonizes with them in appearance, and requires no scrubbing or burnishing to keep it permanently as bright as when new. Its construction is so strong and solid that it is practically indestructable. For sale by all dealers in plumbing supplies, and by

THE SANITAS MANUFACTURING CO.,
20 TREMONT ST., BOSTON, MASS.

AGENCIES:

C. G. Cunningham & Co., 207 Tremont St., Boston, Mass.; 54 Gold St., New York, N. Y.; 47-49 Dearborn St., Chicago, Ill.
W. F. & D. D. Kearns, 220 Walnut St., Cincinnati, O.; 216 Chestnut St., St. Louis, Mo.
Arnold & Co., 40 California St., San Francisco, Cal.
Armand Higman, 220 Sparks St., Ottawa, Ont.

A PAMPHLET has recently been issued under the title of "Additional Designs for Iron Greenhouses, Palm-Houses and Conservatories, taken from photographs of work recently erected by Plenty's Horticultural and Skylight Works, of 144 Pearl Street, New York."

In looking it over one would be struck with the grace and proportion obtained by the very simple lines of construction, and by the subordinate part which the buildings play in the exhibit of plants, so that it is easy to realize the fact, often commented upon, of the extreme lightness and airiness of buildings of this construction, which throws no shadow and conveys the impression of unobstructed sunlight.

The growth and increasing wealth of the country is creating a demand for permanent greenhouses and horticultural structures, and by those who have experienced the constant annoyance of continually repainting and reputtying wooden greenhouses, the system of

puttyless-glazing will be well appreciated. The Helliwell Patent Puttyless Glazing has been used in this country for the past three years, and has proved itself adequate to all the varying conditions of our changeable climate. It has given universal satisfaction wherever it has been used. A glance over the letters and testimonials given will show what its patrons think of it. Some very successful examples of this system has been erected by me for the following gentlemen, among many: L. L. Lorillard, Esq., Newport, R. I.; Henry Graves, Esq., Orange, N. J.; D. B. Wesson, Esq., Northboro, Mass.; J. Pierpont Morgan, Esq., Highland Falls, N. Y.; Alfred C. Harrison, Esq., Chestnut Hill, Pa.; H. M. Boies, Esq., Scranton, Pa.; Edward D. Adams, Esq., Seabright, N. J.; W. H. De Forest, Esq., Summit, N. J.; G. Krueger, Esq., Newark, N. J.; H. B. Perkins, Esq., Warren, O.; H. E. Lawrence, Esq., Sparkill, N. Y.; M. D. Thatcher, Esq., Pueblo, Col.; J. E. Smith, Esq., Beatrice, Neb.; James Clarke, Esq., Louisville, Ky.

In the matter of skylight or roof-lights, the Helliwell system is altogether without a rival. For strength, lightness and durability the new patent rolled-steel bars are not to be compared with bars made of galvanized-iron. The system is now specified by the most prominent architects of the country on their best work.

We give an illustration of the new passenger station at Jersey City just erected and glazed under this system for the Central Railroad of New Jersey, and Baltimore and Ohio Railroads. This skylight contains about 30,000 square feet of glass, the main trusses are 32 feet apart, and the skylight-bars span 13' 6" between purlins. The architects are Messrs. Peabody & Stearns, Boston, Mass.

We also give sectional cuts of the shape of the bars, and of the method of arranging and fastening the glass in position.

Any one who contemplates the erection of glass buildings of any description, will benefit by the perusal of the pamphlets and circulars on this subject published by

JOSEPHUS PLENTY,
144 Pearl Street, New York.

THE STAR METAL-CORED RUBBER-STOPPER.

Among the many firms engaged in the manufacture of bath-room and laundry appliances, there is none that stands higher than The Wm. Powell Company, of Cincinnati, O. Organized in 1846 under the style of Wm. Powell & Company, and incorporated in 1886, we rank among the pioneers in this business.

Enterprising and ever on the alert, we have been quick to note the demands of the trade, and have been constantly making improvements in this class of goods. And our reputation for fair-dealing and honest work has been such that our goods have become deservedly popular, as stated. In 1886 this Company was incorporated as The Wm. Powell Company, and our faculties for doing good work have been constantly increasing.

Among the recent improvements which we offer the trade is the Star Metal-cored Rubber-Stopper, a cut of which we present herewith.

When some years ago we introduced the Star Rubber-Stopper, it was received with favor and universally adopted by the trade, but it had its defects. Now, however, we present a Stopper that is perfect. The Metal-core is completely enveloped in a rubber-casing, the core extending up into the rubber-neck, thereby preventing any strain on the rubber, and its weight is sufficient to prevent it floating from its socket. While the metallic parts being protected by the rubber casing, all danger of injuring china-basins or polished linings of bath-tubs is entirely obviated; at the same time the prices have been so reduced as to enable them to displace the old brass style. Any information relative to prices and discounts may be obtained by addressing the sole manufacturers and owners of the patent,

THE WM. POWELL COMPANY,
50, 52 and 54 Plum Street, Cincinnati, O.

NOTES.

The Manhattan Brass Company, First Avenue, Twenty-seventh to Twenty-eighth Streets, New York, whose advertisement appears on page i, are making a specialty of interior brass decorations of a superior quality for theatres, banks, offices, etc., consisting of railings and grill-work of all patterns. They have just completed the railings and grill-work throughout Proctor's new building, Twenty-third Street, located between Sixth and Seventh Avenues. A very beautiful and complete piece of workmanship in all its detail, and it would pay all admirers of fine workmanship to examine. They are also continually putting up some of the very fine brass and bronze stoop-rails seen throughout the city. For quality, finish and workmanship this Company cannot be excelled.

The Whittier Machine Company have recently put into the house of Mr. U. B. Crocker on Commonwealth Ave., Boston, Mass., an hydraulic plunger elevator for passenger service. For the Masonic Temple in Washington, D. C., one horizontal steel boiler and an hydraulic piston passenger elevator upon their Pressure Tank System. Also for Messrs. Prestwich & Fuller of Westerly, R. I., three horizontal steel boilers, each two and one-half feet in diameter.

Dixon's Silica-Graphite Paint, made by the Jos. Dixon Crucible Co., Jersey City, N. J., covers more than double the surface of any other paint. It is unaffected by heat or cold, storms, salt air, rust or even acids. A tin roof well painted will not need repainting for 10 to 15 years or longer. It is equally useful for metal, iron or wood work.

Messrs. J. & R. Lamb have recently executed for the Church of St. Martin, in the Fields, Chestnut Hill, Philadelphia, Pa., from plans by G. W. & W. D. Hewitt, architects, brass pulpit, eagle lectern, brass and oak communion-rail, and a brass and oak font-cover. All are of intricate design and elaborate workmanship. Grace Memorial Chapel, at Evansville, Ind., Messrs. Reid Bros., architects, has recently been completed. Messrs. J. & R. Lamb, of New York, have furnished for this chapel a beautiful stained-glass window, antique oak pulpit and bronze memorial tablet. The chapel is built by Mrs. David J. Mackay, of Evansville, in memory of her parents, John and Sarah Law.

An important organization entitled "Booth Brothers & Hurricane Isle Granite Company," has just been incorporated, with a capital of $250,000.00 for the purpose of carrying on an extensive quarrying and contracting business in rough and cut granite.

It is a consolidation of two important concerns. Messrs. Booth Brothers have been established in New York for eighteen years past, having their office at 60 Bank Street, and their yard at 113th Street and Avenue A, and their quarries at Millstone Point, Niantic, Conn., and Long Cove, Tenant's Harbor, Me. The Hurricane Isle Company had also been in business for a number of years in the same line.

The officers of the new company are: Mr. William Booth, President; Mr. John Booth, Treasurer; Mr. John Donaldson and Mr. Charles S. Ferguson, Secretaries. Mr. James Shands and Mr. William S. White are also among the incorporators. All of these gentlemen are well and favorably known in the trade, and all bring important connections and relationships to the new company.

The office of the company remains at 60 Bank Street, and the New York yard at 113th Street and Avenue A, and the company will operate about half-a-dozen of the largest granite quarries in the country, mostly in the State of Maine, the others being in Connecticut and Rhode Island. This consolidation of different interests makes the company one of the largest concerns in the business, and its facilities and arrangements are unsurpassed. It is quite certain that the company will do a large business from the first.

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The season is at hand when builders of homes, are looking around for the best medium in every line, with which to improve the artistic effect of "our new house."

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These goods are yearly growing in favor and have come to stay. Messrs. S. Bowen's Sons, 150 N. 4th Street, Philadelphia, make the "Pecora" Mortar Stains and are doing an extensive business in these goods and have recently published a book of gelatine plates, illustrating the edifices in which their goods are used, with letters from the prominent builders and architects connected with same. Architects and masons or owners, will be favored with copies by writing for them and will no doubt be enlightened and interested in this work.

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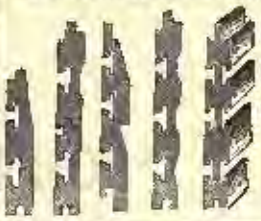

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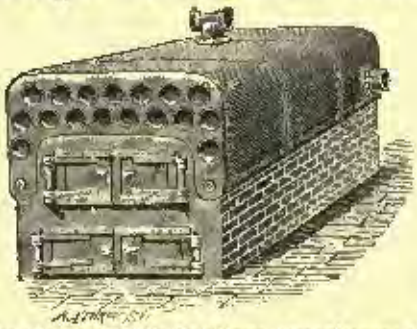

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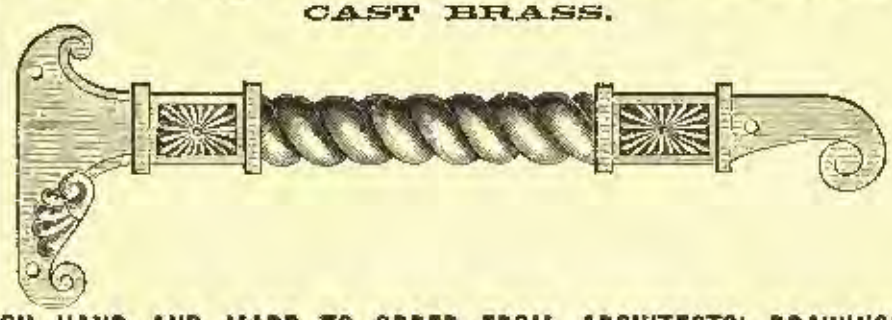

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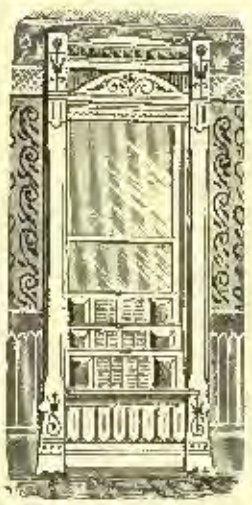

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The American Architect and Building News.

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May 4, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE Legislature of the State of Texas has passed the law proposed not long ago, requiring all persons who wish to practise as architects within the State to present themselves before a Board of Examiners, for the purpose of obtaining a certificate of competency, without which they cannot pursue the profession. The State Association of Architects has approved the measure, so it is probably suited to professional ideas, and architects generally will watch its operation with much curiosity. One point of importance about the new law will be its effect upon architects from outside the State, who may be employed to do work there. We do not know the exact text of the bill as passed, but it has been suggested in other States that persons practising without a certificate should be denied the assistance of the courts in collecting payment for their services. If any such rule has been adopted in Texas, it will be best for architects from outside, however well qualified, to be cautious in accepting commissions for which they may never be able to collect their pay; and, if they should be caught in the unpleasant predicament of having to resort to force to defend their rights, to see that they apply to the Federal Courts, which would, we suppose, take no account of local regulations.

A NEW source of danger in hospitals and similar buildings has been pointed out by an Austrian military surgeon. According to him, several cases of infectious disease had occurred in certain Austrian barracks, and, after a strong, healthy artillery-man had been carried off in a week by an attack of typhoid pneumonia, the floor under his bed was taken up, and a mass of mould and fungus two yards square was discovered beneath it. The surgeon proposes, in view of the dangers to be expected from such conditions, that the walls and floors of barracks and hospitals should be covered with coal-tar, which is sufficiently antiseptic, he thinks, to prevent the formation of such growths, while it would cover up all seams and fissures with a smooth, impermeable coat, which could be washed with facility. If an architect were to propose such a thing he would be denounced as an ignorant and unskilful person, but because it is the suggestion of an amateur we suppose the experiment is likely to be tried, with great glorification of its inventor, who will be forgotten by the time the timber, shut out from the air by the impervious coating, has rotted away, and the coal-tar, converted into dust by the evaporation of the volatile hydrocarbons which keep it plastic, has been carried off in the lungs of the inmates of the building. To the mind of an architect, the existence of mould and fungus suggests the need of ventilation more than anything else, and we should say that opening the basement-windows, or rather, constructing the building on open arches, without any basement, as is now common for hospitals, with renewal of the floor, and removal of all impervious coverings that might keep the air away from it, would do more good than all the disinfectants, coal-tar included, that could be spread upon the interior.

AN architect sends to *L'Architecture* a warning, which we hand along to our readers, to the effect that if any of them should happen to be in the railroad station at Enghien, a little village near Paris, and should be tempted to lean against the iron columns which support the roof over the platform, they should resist the temptation, lest they meet the fate of Samson. As it is unusual for iron columns to collapse when any one leans against them, the case of those at Enghien seems to need explanation, which the architect gives by relating that while waiting in the station one day, his attention was attracted by some screws in the sides of the columns. The screws did not appear to hold anything, but looked as if they had been driven in at random, and closer observation showed that the columns so treated were broken in two across the middle, and the lower half was in some cases also split. The seams, as well as the screw-heads, had been puttied up, but did not escape the eye of the expert, who searched until he found one of the railroad men who could explain this architectural mystery. It then appeared that the columns had been broken, and mended by the ingenious process of arranging the fragments together, thrusting a stick through them, and screwing the portions of the shell to the stick. A little paint then gave the whole affair the appearance of perfect solidity, and, as the writer says, it will probably last until some crowd of holiday passengers presses against the columns and brings the whole affair down about its ears.

A QUESTION as important to architects and builders as it is common in their practice was recently decided by the highest authority in France in a particularly clear and succinct manner. As *L'Architecture* gives only the barest memorandum of the case, we can only infer what the circumstances may have been; but the details of the affair are not of much importance so long as the court clearly states the principle, as in this case, that "A town cannot refuse to pay for extras not included in the contract if such extras consist either in the execution of modifications from the original plan ordered by the superior authority of the Commissioners of School-buildings, or in work which was indispensable to the good execution of the building, and has been for the advantage of the town." In regard to the architect, the same decision says that, "Although the unauthorized extra work might have been included in the contract and specifications if they had been prepared with more care, the cost of them cannot be charged to the architect, but the commission which he would charge on these extra works may be withheld from him." Another point which seems to have come up in the same case, and which is of considerable importance, was decided by the court in the following words: "When the contract between the architect and his client allots a certain sum as the '*frais de déplacement*,' or compensation for being absent from his office, to the architect, the sum allotted may be increased according to circumstances." The story seems to show that the idea that the architect ought to pay out of his own pocket for everything that the owner wants in his house, which his omniscience did not enable him to discover before the contracts were made, occasionally makes its appearance in France, to meet with the same fate before the courts as in other civilized countries.

ACCORDING to the *Wiener Bauindustrie-Zeitung*, the Emperor of Russia has given his assent to the project for the construction of a railway extending from the present terminus of the Siberian line to Vladivostock, on the Sea of Japan. The route which has been traced for the road follows the north side of the Altai Mountains from the present terminus of the Siberian military railway to Irkutsk, and thence runs easterly, across the mountains, to the head-waters of the Amoor River. From this point it follows the Amoor Valley southeasterly until the river turns toward the north, when the railroad leaves it, striking southward to the coast, which it reaches at Vladivostock. The cost of this gigantic piece of engineering is estimated at four hundred and fifty million dollars, the total length of the line, from St. Petersburg to Vladivostock, being about sixty-two hundred miles, of which

more than a thousand is already in operation. As a commercial route the new line may not be immediately successful, but as an auxiliary to military operations it will undoubtedly be of the utmost importance. To say nothing of the fact that its stations, all of which will probably be fortified, as are those of the present Siberian Railway, will form a line of military posts close to the Chinese frontier, to which the Chinese can oppose nothing similar, it will bring St. Petersburg practically close to the door of Japan, and even in peaceful times will make St. Petersburg the market through which Japanese products must be mainly distributed to the rest of the world. According to the newspapers, Senator Stanford, of California, has had a dream, or a inspiration of some sort, in which he has perceived that the United States and Siberia would before many years be connected by a railway. Just how the railway is to cross Behring's Strait is not decided, nor, indeed, is it settled how a railroad is to be operated in winter in Alaska and Kamtchatka, but Russia seems disposed at least to do her part, and it is the turn of the United States to make the next move.

A CANAL has just been constructed in Belgium, in which, instead of locks, the boats are hoisted by elevators from one level to another. The canal extends from the coal region in the interior of Belgium to Brussels, crossing several other canals at the same grade, so that Belgian coal can be brought directly by boats to Paris, as well as to all the principal towns in Belgium and Holland. As the line passes over a rather hilly country, various ascents and descents must be made, and to save the long delays incidental to passing locks, the change of grade is made by means of hydraulic elevators. The boats, which measure about seventy tons, are towed at the low level into an immense tank, with gates, which is submerged in the canal. The gates are then closed, and the tank, which rests on the pistons of a huge hydraulic elevator, is raised to the upper level, when connection is made with the next section of the canal by means of double gates, and the boat proceeds on its way. The lift of the Elevator No. 1, at Houdeng-Goegnies, which is carefully described and illustrated in *Le Génie Civil*, is about fifty feet. The hydraulic apparatus is calculated to raise a weight of one thousand and forty-eight metric tons, or considerably more than the same number of our tons, and power is obtained by means of steam pumps, which force water from the canal into pressure tanks. The apparatus is double, so that two boats can be handled at once, and the ascent and descent, including all the operations of opening and shutting the gates and receiving and discharging the boats, occupies fifteen minutes. The cost of the apparatus, exclusive of earthwork and masonry, patents, engineering and purchase of land, was about one hundred and seventy-five thousand dollars.

WHILE *Sanitary News* reports a curious case of poisoning which occurred recently in London. At a children's party, at Christmas, which was enlivened by a Christmas tree, several of the guests, including older people as well as children, were attacked by singular symptoms, which could not be ascribed to any of the causes which usually produce the ailments incident to children's parties. Some particularly intelligent person seems to have noticed a resemblance between the symptoms and those of arsenical poisoning, and attention was drawn to the candles on the Christmas-tree, many of which were of a bright green color. Samples of the green candles were submitted to an official analyst, who reported that they were colored with arseniate of copper, and, presumably, in burning would diffuse vapors of arsenic through the air. Some of the red candles on the tree were also analyzed and found to contain vermillion, which might, we suppose, give off fumes of mercury during the burning of the candles. As thousands of Christmas trees are exhibited every year in this country, to many thousands of children, and the bright-colored candles borned on them must be counted by millions, it would not be amiss for our State Boards of Health to find out whether the candles generally sold contain, like the London ones, volatile poisonous substances, and what effects, if any, have been traced to the use of them; and, if there should be other well-authenticated cases of injury resulting from their use, to procure legislation forbidding their sale, and providing for the inspection of those manufactured or imported. Meanwhile, some chemist might do good by publishing a simple test by which poisonous articles of the kind could be readily detected with the appliances common to the average household.

AS the time approaches when it will be necessary to make and announce the final arrangements for the conduct of the examination for the *American Architect* Travelling-Scholarship, we desire to be definitely informed as to the names and addresses of those who propose to enter the competition. It is our intention to conduct the preliminary examination, at least, by mail, and if it should prove that most of those who are successful in passing the preliminary examination are stationed at a distance from Boston, and could only take part in a *viva voce* examination at considerable expense to themselves in the way of car fare and lodging, we shall endeavor to decide the competition entirely by means of the mail.

WE are grateful for the solicitude expressed by certain well-wishers who have inquired whether the recent change in the composition of the firm publishing this journal would in any way affect the usefulness and prosperity of the *American Architect*. We are pleased to say that the change of partnership is likely to tend to the benefit rather than to the prejudice of our supporters, as it is the purpose of Messrs. Ticknor & Company to henceforward devote themselves to the publication of technical rather than miscellaneous literature. Naturally, the tendency will be to extend the line of architectural books which will support and will gain support from this journal, and, as one thing helps another, we believe that the greater interest that is now to be devoted to this line of publication will enable us to make this journal of greater value, even than at present, to all classes of men who have an interest in building.

IT seems to be well settled now that the Nicaragua Canal will at least be begun, and there is a fair prospect that it may be completed, and become the only navigable short-cut between the Atlantic and Pacific Oceans. Notwithstanding the courage and generosity with which the French people have supported M. De Lesseps in the Panama scheme, it now appears certain that the enterprise will be abandoned. So long as any hope of its completion remained, the French journals spoke with natural disfavor of the competing canal at Nicaragua, but they now, so far as we can learn, have generally made up their minds that it would be folly to waste any more money in building a ship-canal over a mountain range, by means of locks which would apparently be dry most of the time, and regard the Nicaragua plan with much more equanimity than before. So far as the United States is concerned, the completion of the Nicaragua Canal, instead of that at Panama, is certainly very desirable. To a ship passing through the Panama cutting from the Pacific, Liverpool would be about as near as New York, and traffic would go to the port presenting the preponderance of advantages, which would undoubtedly be Liverpool. By the Nicaragua route, New York would be nearer, by a distance long enough to offer compensation for the advantages of docks and transhipment facilities existing at Liverpool, and the balance would be likely to incline toward our own ports in a great many cases; much to the advantage of our citizens, who, if they are forbidden to have any ships of their own, like to see their wharves occupied by foreign craft.

TO recapitulate, according to the most recent information, the comparative advantages of the Nicaragua and the Panama routes: the Nicaragua line, according to the surveys now determined upon, is one hundred and seventy miles long. This, of course, is something like five times the length of the Panama route, but the Nicaragua line has the immense advantage of possessing deep water at the highest level, while at Panama the locks by which the ridge of the Culebra must be crossed would have to be supplied artificially with water. At Nicaragua, the only excavation needed is at the ends of the canal, where low hills enclose a chain of lakes one hundred and fifty-two miles long, filled with water deep enough for navigation, and extending to within three miles of the Pacific Ocean on one side, and fifteen miles of the Atlantic on the other. By cutting through the hills a chain of locks will be formed, supplied with water from the lake at the summit, and vessels can easily climb the one hundred and seven feet of elevation which separates the lake from the oceans. Since the arrival of the colony of engineers which was sent out a year or more ago the final surveys have gone on rapidly, and a second working party is to sail from New York on the tenth of this month to begin the execution of the plans.

EQUESTRIAN MONUMENTS.[1] — XV.

THE CONDOTTIERI. — II.

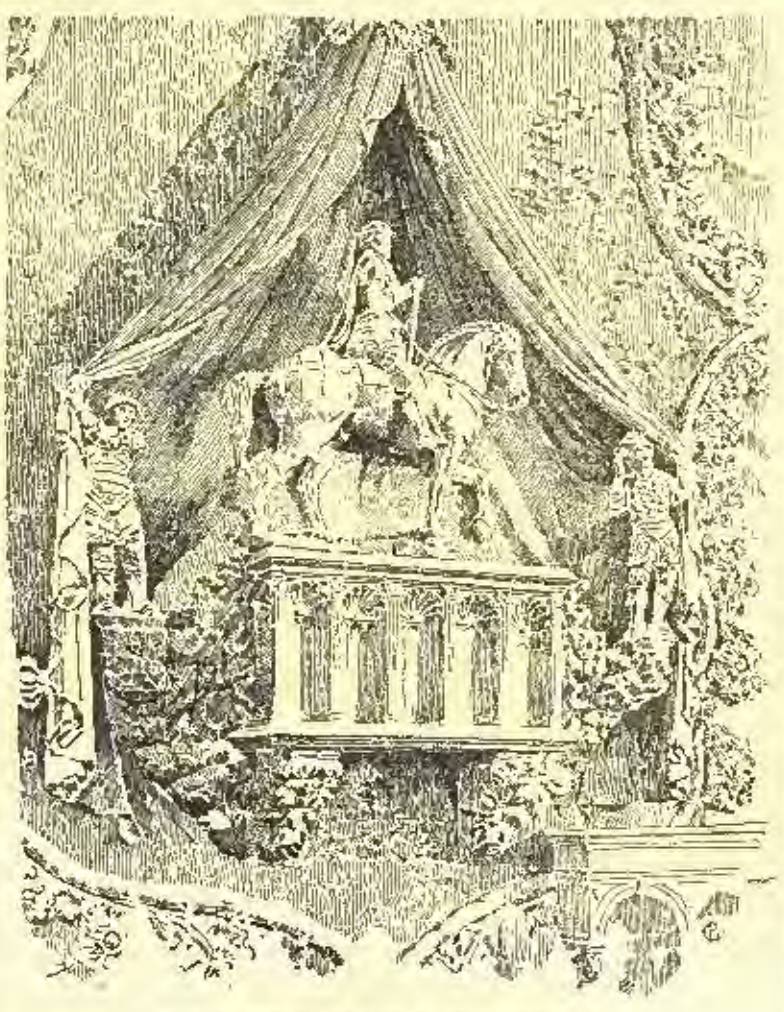
The King of Assyria in Battle. After Rene Menard's "*La Vie privée des Anciens.*"

THERE are two points to be observed while dealing with this period of continuous petty wars; the first is that the greater part of these struggles took place either before the invention of gunpowder or before firearms had come into general use, and hence the contending forces were more or less completely clad in armor, thanks to which the losses of the contestants were ludicrously small in comparison with the effort, and consequently the same men "lived to fight another day," — and many more after that. Thus at the battle of Anghiari — immortalized by Leonardo da Vinci in his famous cartoon the "Battle of the Standard" — which was an important engagement, the combined loss footed up one, a man-at-arms who tumbled off his horse, and being hampered by his heavy armor could not get onto his feet in time to escape being trampled to death. There was, however, enough bloodshed, but it was that of the non-combatant, the citizen who attempted to defend wife or daughter after a captured town had been turned over to the lust of the conquerors.[2]

The other fact, which has also a bearing on the singular immunity of the combatants, is that these battles were fought and seiges conducted by hirelings whose first care was their pay, and their next the ransom of their prisoners. So that where the battle was honestly waged the object was not to slay, but to capture for the sake of obtaining a ransom. Moreover, it was for the advantage of these mercenaries to prolong operations as much as possible, and at times there came to be a perfect understanding between the leaders, so that it was not an unusual thing for a besieging force to secretly introduce provisions into the beleagured place that it might not be captured too speedily, and the hired forces both inside the walls and out be in consequence out of a job. When the amount paid to these men is known, and when it is considered what pleasures gold could secure in those days, it is not to be wondered that their battles were waged with a view to prolonging their income: Federigo of Montefeltro — who afterward became the "good Duke of Urbino," — as captain-general of the Italian League was paid yearly 165,000 ducats, 45,000 of which were for his own purse, and while he served Alfonso of Naples, his pay was 8,000 ducats per month.

One of the acts that distinguished Federigo of Montefeltro as perhaps the most noble and humane member of his class, was his behavior during a time of famine, when the King of Naples and the Pope were making money by the monopoly they had established in corn. Federigo declared that he was not a merchant but merely a soldier, and that his only care was to save his people from hunger; accordingly he brought grain from Apulia and filled his storehouses that he might sell to his dependants at less cost than they could elsewhere procure the necessaries of life. It is worthy of note that attached to Duke Federigo's court, to which all the chivalry and learning of Italy flocked, were five architects and engineers.

Very different was the manner in which Bernabo Visconti treated his subjects while he ruled Milan. To help them save their hard-earned scudi was the last thing he thought of: on the contrary, one of his chiefest cares was how to empty their pockets into his own ever ravenous one. A very ingenious device which exemplifies the "heads I win; tails you lose" principle was at one time employed by him. He was a mighty sportsman and particularly fond of pig-sticking, and so kept large packs of boar-hounds, in all some 5,000 beasts; these he quartered on his unfortunate peasantry and then established a regular system of inspection; if the dogs were found to be thin and ill-kept, the man on whom they were billeted was punished and heavily fined; if they were too well-fed, fines and punishment followed equally; while if any had died, the unfortunate keeper was imprisoned and all his property was forfeited. Whatever the condition of the dogs might be, the condition of Bernabo's purse was always, through this ingenious device, found to be in good case. This was one of the mildest freaks of this interesting personage who was afflicted with a blood-thirst very similar to that of Ezzelino, and State criminals were by his orders subjected to torture during forty days — provided their endurance sustained them so long, and the greatest attention was lavished on them after one torture, that they might recuperate enough not to succumb to the next one.



Cortesia Savage [or Savargo]. St. Anastasia at Verona.

The territory ruled over by the Visconti was at this time divided between Bernabo and his brother Galeazzo, to whose share his son, Gian Galeazzo, succeeded on his father's death. Then uncle and nephew each determined to obtain the other's portion and unite the territory under one head. The result of this common purpose was one of the usual family broils which add so much to the incident of Italian history. In it both force and craft were employed, the younger man mainly relying on the latter, and employing it most skilfully, the result being that Bernabo was led to believe that his nephew was but a poor creature; so when the latter, in 1385, pretended to make a pilgrimage to Our Lady of Varese, and in so doing passed near Milan, Bernabo and his sons came out to meet him without the protection of a large guard. As soon as Gian saw his uncle in his power he ordered his own guards to seize him, and at once Bernabo was hurried away to prison and served with a cup of cold poison in place of being flayed alive, after the fashion in which he had served many of his victims in their last disrobing in this life. So Gian ruled over all the possessions of the Visconti.

But although Bernabo Visconti was not a *condottiere* or a particularly illustrious person — morally speaking — his equestrian statue was wrought in 1354 and survives to us. It is one of the large class of sepulchral monuments, but, oddly enough, the tomb which it was made to adorn was not that of Bernabo, but of his wife, Regina della Scala, who in her lifetime had done what she might to soften the savage humors of her husband. The statue now stands in the Archæological Museum in the Brera at Milan, where its faded magnificence of gilding and color are not unfitting reminders of a vanished pomp, while the stern and rigid features of the Duke suggest the unyielding character of the man. The architectural character which the sculptor, Matteo [or Bonino] da Campione, has contrived to give to the horse, which suggests little of the grace of the real animal, is admirably adapted to the requirements of sepulchral sculpture, and adds

[1] Continued from page 191, No. 685.

[2] "After the four days' devastation of Piacenza, which Sforza was compelled to permit, the town stood empty, and at last had to be peopled by force." — Burckhardt's "*Renaissance in Italy.*"

not a little to the dignity of the monument. The tomb was placed originally behind the altar in San Giovanni in Conca, but because of the height of the monument the mounted figure appeared above the structure of the altar, and, consequently, worshippers had the air of addressing their petitions to the bloody human tyrant, rather than to the all-gracious Deity. This sort of thing could not be long endured after Bernabo's death, and it was soon after that event removed to a place near the door, and at a later day was transferred to its present resting-place, on the plea, perhaps, that secular, rather than religious, surroundings were most suited for it. The two figures which, like pages, stand on either hand, represent Fortitude and Justice.

The islands in the Adriatic to which some of the inhabitants of Padua, Vicenza, Verona and Treviso had fled in 452 to escape the hordes of Attila, had by slow degrees grown to be the mighty Venetian republic, ruled over by a doge—first elected in 697, the city itself being founded in 809. For a long time the interests of the Venetians lay rather in the Levant than in the Italian peninsula, and by reason of their position the inhabitants became a race of sailors, and because of their comparatively isolated position were able to develop mercantile pursuits somewhat rapidly; but the merchant fleets being exposed to the depredations of the pirates of the Adriatic and the Grecian Archipelago compelled the formation of a navy for the protection of their commerce and revenge upon the depredators. For centuries their operations were mainly in the East, and amongst other affairs they took a prominent part in the first crusade, sending a fleet of 200 vessels and taking part in the capture of Acre, Tyre, Sidon and Ascalon, and in 1198 their vessels were chartered by Foulk de Neuilly for another crusade. But finding themselves unable to pay the charter money the whilom crusaders in its stead offered the republic their services to aid in the recapture of the revolted city Zara, and the operations so begun were extended to an attack on Constantinople, which ended in the storm of the city in 1254, and the incidental transference to Venice of the horses of St. Mark's. During this period the republic of Genoa, in a corresponding position on the other side of Italy, had also developed into a maritime power of first importance and in the confined area to which the commerce of those days was restricted, it is not strange that disputes should arise between the Venetians and the Genoese which developed into great naval battles. These quarrels naturally engendered the making of alliances by one power or the other with some of the cities or States of Italy and, as a consequence, the struggles came to be carried on by land as well as by sea and Venice was at length as bitterly embroiled with its Italian neighbors as the non-amphibious cities of central Italy. As the sailor population of the Venetian republic were not accustomed to operations on dry land it became more necessary for them than for others to employ mercenaries, and because of the length of the republic's purse it was a very easy matter for them to command the services of the leading *condottieri* of the day, as for instance Francisco Carmagnola—who, being suspected by his employer Filippo Maria Visconti, was in consequence banished from Milan and immediately entered the service of Venice then at war with Milan, and was put at the head of the republic's army; but because he followed the habit of his kind and after a certain battle released his prisoners—his former companions in arms—he became suspected by his new employers and being decoyed back to the city on false pretexts was then accused of treason, thrown into prison, tortured and beheaded.

It is this employment of *condottieri* in the many campaigns in Italy that accounts for the presence in the Church of SS. Giovanni e Paolo at Venice, of several equestrian statues, a kind of monument seemingly having no connection with the ordinary pursuits of the citizens.

It is not necessary to suppose that these monuments are always evidence of the actual interment within the church of the bodies of the famous men they honor. In one case, at least, we know that a monument, that of Marc Antonio Bragadino [1596] marks the resting place not even of the ashes of this famous governor of Cyprus but merely of his skin. After a prolonged siege of Famagosta by the Turks, Bragadino surrendered after receiving a pledge of honorable treatment for himself and men: once in possession of the place the Turks disregarded their word, massacred the troops and, after ten days of varied and ingenious torture, flayed Bragadino alive and then stuffing his skin suspended the horrid effigy from the prow of the Turkish admiral's galley during the voyage back to Constantinople. Subsequently Bragadino's family purchased this trophy and enurned it at SS. Giovanni e Paolo. The monument erected to his memory was not of equestrian character, however. This church is to Venice much what Westminster Abbey is to London and rulers and leaders of every kind are here honored with monuments of many kinds, amongst which are the equestrian figure, in gilded wood, of Nicolo Orsini who led the armies of the Republic in the war with League of Cambray and died in 1510; one of Leonardo da Prato, a knight of Rhodes [1511], which so far as the photograph throws any light on it, may be also of wood; one of Pompeo Giustiniani [1616] by Frane Terilli and one of Orazio Baglioni [1617]. Besides these which sufficiently mark the amphibious character of the people, the church of Sta. Maria dei Frari contains the equestrian monument, which is surely of wood, of Paolo Savelli, a noted *condottiere* who fell in battle against Francesco de Carrara in 1405; while in the church of S. Stefano is a monument to one of the Contarini which dates from the middle of the seventeenth century.

M C C C C L V I I I
QVO NEMO VTILIOR PATRIÆ NEC PACE NEC ARMIS
BENE TVOLE GENTIS HANNIBAL HIC SITVS EST
EXPVLSIS DVDVM POSSESSA EXVRBE TIRANNIS
ET PROFVGOS CIVES RESTITVIT PATRIÆ
ARMIGERVS INGRATÆ SCELERATA MORTE PEREMPTVS
SED MERITVM SVMPSIT FACTO SVPPLICIVM
NAM SCELERIS TANTI AFFINIS NOCVISSE FVIT SAT
HIC FERRO AVT FLAMMÆ PREMIA DIGNA TVLIT

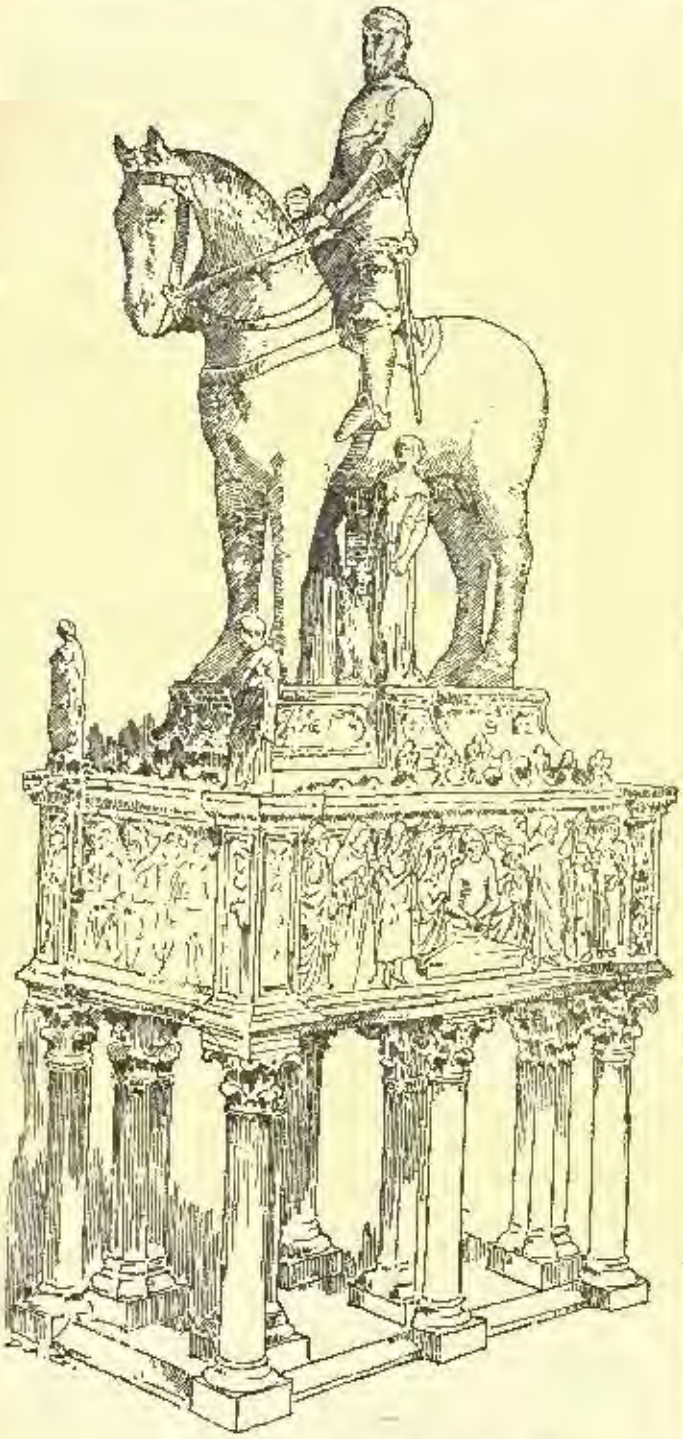
Annibale Bentivoglio in the Church of S. Gregorio Maggiore, Bologna. From Litta's "*Famiglie celebri Italiane.*"

It is possible that art could have spared these monuments but history could not. The grim and dwarfish figure of Savelli on his big horse is worth pages of word-painting in helping the student to an understanding of how it was possible for the men of those days to do the soulless deeds with which they are credited. Perkins may speak of the "depth of degradation to which sacro-monumental art eventually fell" but he speaks as a student of art and not of history, and is quite as unwarranted in contemning the equestrian mural monuments for their want of "sacred" character as he would be in disparaging Stevens's Wellington in St. Paul's. The wrong in both cases rests not on the side of art but on the selection of a sacred edifice as a national Walhalla. These Italian mural monuments have no prototypes elsewhere, though there are mural tombs in Westminster Abbey, in St. Paul's, at St. Denis and elsewhere where the sculptured horse is introduced.

Although there are at Venice more of these equestrian sepulchral monuments than elsewhere, there are others belonging to the same class otherwheres in Italy, but only in the northern cities. One of these was—for it no longer exists—of somewhat unusual interest, and was notable for several things: first, because of an anecdotic or legendary interest, as it embodied in monumental form a real incident of the career of Pietro Farnese, a *condottiere* of the fourteenth century; next, because the equine portion of the group was half asinine—in reality, not in artistic merit; next, because the beast was one of the first of the large number of rearing steeds whose attitude too often serves as the point for unmeaning criticism; and, lastly, because of the material of which the monument was constructed.

Pietro Farnese—who afterwards died of a plague in 1363—while engaged in battle with the Pisans, had his horse killed under him, and, as there happened to be no other steed within reach at the

moment, had to content himself with a sumpter mule which he seized, and continued to lead his troops to final victory. The incident was thought memorable enough to be commemorated, and Farnese's tomb was surmounted by a wooden group, covered with canvas, of Farnese and his humble steed, though the sculptor, who is variously thought to have been Jacopo Orcagna, Giuliano d'Arrigo, or Angelo Gaddi, felt obliged to disguise the hybrid character of the mount by throwing a hooded horse-cloth over it, and taking certain artistic license in the treatment of the tail. The statue existed until 1842,

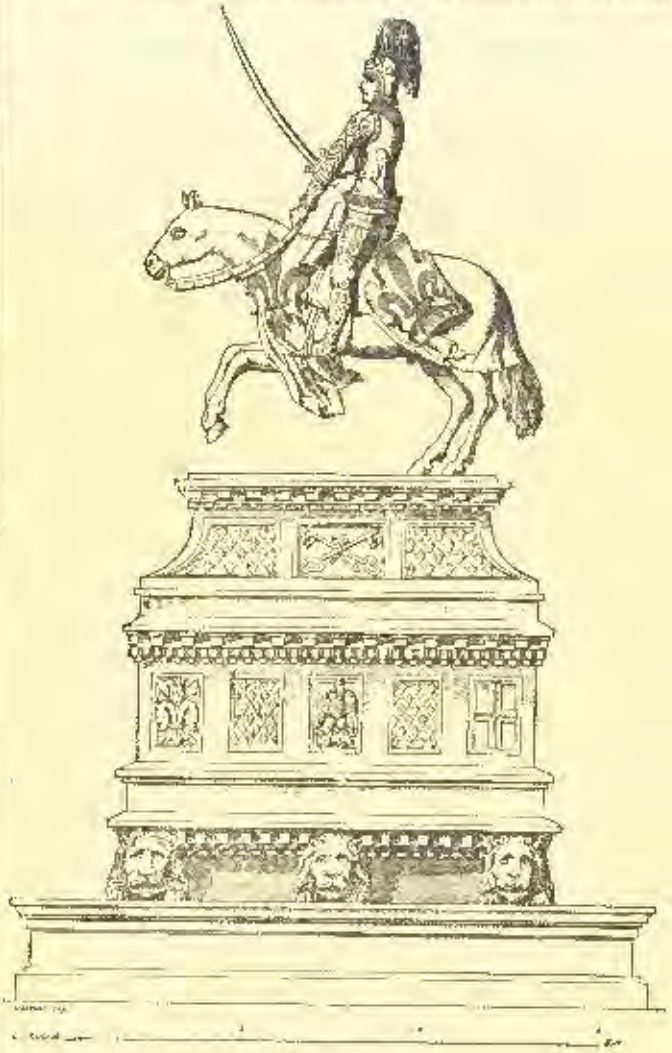


Bernabo Visconti. Archæological Museum in the Brera, Milan.

when, during repairs on the Cathedral of Santa Maria del Fiore, the monument had to be displaced and the statue fell to pieces, and has never been restored.

Another rearing steed, in high relief this time, is the one that supports the figure of Annibale Bentivoglio on his tomb in the family chapel in the Church of S. Giacomo Maggiore at Bologna, which is believed to be the work of Niccolo da Bari, and belongs to the fifteenth century. This figure is life-size and colored. Of about the same date is the statue of Cortesio Sarego [or Sarengo] in the choir of the Church of S. Anastasia at Verona, which, in style, is closely allied to the equestrian tombs at Venice, and, as the sculptor's name is unknown, we are at liberty to assume that some Venetian sculptor driven into political exile had sought refuge at Verona. The isolation of the figure by means of the drawn-back curtains is certainly ingeniously devised, though the device is one that a sculptor of a later day might be expected to practise rather than a master in the fifteenth century.

The same upholsterer's motive was adopted in another monument, that of the Marquis Spinetta Malaspina in the Church of S. Giovanni



Monument to Piero Farnese in the Cathedral, Florence. From Litta's "*Famiglie celebri Italiane.*"

in Sacco, also in Verona, though here the drapery has more the appearance of tent-folds, and less that of curtains. Why it should be that less stare was set on this monument by the Italian authorities than on some others it is hard to say, but for some reason this work

Roberto Malatesta in the Louvre. From the *Gazette des Beaux-Arts.*

of art, such as it is, found its way into the market, and was bought by the South Kensington Museum authorities in 1888 for about $1,700 and removed to London, where it has been set up in the

Architectural Court. Unfortunately, the figure, more than life-size, which was executed in stucco or gesso, was badly broken in transit, though it was still within the power of skilful repairers to restore it to an almost perfect condition.

South Kensington is not the only museum, however, whose walls are graced by the equestrian figure of an Italian *condottiere*. The Louvre, too, has its specimen, intrinsically, a more valuable one in that it is the work of Paolo Romano, which represents one of the typical *condottiere* of the fifteenth century, a member of the hated family of the Malatesta of Rimini. Roberto Malatesta was an

Leonardo da Prato in S. Giovanni e Paolo, Venice.

illegitimate son of Sigismund, Lord of Rimini, and at his father's death took the usual steps to secure the succession for himself. Deceitful diplomacy, poison and cold steel prevailed, and once firmly settled with the aid of the Duke of Urbino, whose daughter he afterward espoused, he overcame the papal troops of Paul II, who, for State reasons, upheld the cause of the legitimate heirs. Later, under another pope, he became himself commander of the papal forces, and rendered such good service that when he succumbed to poison, as usual, in 1482, he was buried in the vaults of St. Peter's, and an equestrian bas-relief — which was to be one of a series commemorating the services of the captains-general of the pontifical troops — was executed at the command of Sixtus IV, by Paolo Romano. [Recent German research shows that this attribution of the work to Paolo Romano is a mistake.] In 1619 this bas-relief was removed to the Villa Borghese, and there set up, but it was afterwards displaced and thrown aside. In its neglected state, it at length caught the eye of the Inspector of Fine Arts for the French Government, who succeeded in buying it for the Louvre from Prince Borghese.

In the Church of San Giuseppe at Aquila is a tomb by a German sculptor Walter Alemanno, whereon the equestrian figure of Ludovico Camponeschi keeps watch and ward over the recumbent figure of his father, Count Valle, Lord of Aquila. The work, which was erected in 1432, is said to be coarse in execution though the general effect is good.

Bernabò Visconti.—Born in 1319; became master of Bergamo, Brescia, Crema and Cremona. He also ruled Milan conjointly with Galeazzo. He was notorious for his cruelty and audacity, and defied the power of the Pope, who excommunicated him. Urban V preached a crusade against him, and united the Emperor Charles IV with other monarchs in a league against him about 1363. Bernabò, however, resisted them with success. He died in 1385, having been murdered by his nephew, Gian Galeazzo, who succeeded him.

Annibale Bentivoglio.—Lord of Bologna, died in 1458.

Niccolò da Bari.—Born in Bari, in Apulia, in or about 1414, and died at Bologna in 1494 or 1495. He was a follower of Jacopo della Quercia, and is often

Paolo Savelli in S. Maria dei Frari, Venice.

called Niccolò dell'Arca from his work on the urn or sarcophagus of St. Domenick, in the Church of St. Domenick, at Bologna. He spent the greater part of his life at Bologna.

Paolo Savelli.—Killed in 1405, in a battle against Francesco da Carrara.

Niccolò Orsini.—Count of Pitigliano, a general in the Venetian army, 1510.

Pietro Farnese.—Died in 1363.

Roberto Malatesta.—Styled "The Magnificent." Born 1442; died 1482.

Corrado Sandeo.—Brother-in-law and general to Antonio della Scala.

Paolo Romano.—Flourished in the first half of the fifteenth century, and in the latter part of it he retired from the world and spent his remaining days in solitude and peace. "We are told by Antonio Filarete, in his manuscript architectural treatise, that Paolo was a goldsmith, as well as a sculptor, and that he helped to make the silver statues of the twelve apostles for the altar of St. Peter's, which were destroyed in the sack of 1527." His other works in Rome are a statue of St. Paul on the Ponte Sant' Angelo, the tomb of Bartolomeo Carafa, in the Church of the Knights of Malta, that of Cardinal Stefaneschi, at Santo Maria, in Trastevere, and (probably) that of Cardina) Philippe d'Alençon in the same church. "Vasari speaks of a highly-praised statue of an armed man on horseback, by Paolo Romano at St. Peter's, and the epitaph placed upon Paolo's tomb mentions his statue of Ovid."

The Condottieri as Patrons of Art.—"There is nothing more curious in the history of Italy in the fifteenth century, than to see truculent soldiers, known as faithless leaders of armies, or guilty perpetrators of dreadful crimes, spending the fruit of their depredations on the erection of sacred edifices, and employing not only the best architects of the world to plan and erect, but great painters to adorn."—From Crowe and Cavalcaselle's "*History of Painting in Italy.*"

Bloodshed in Italian Wars.—"Sabellico talks of much bloodshed (in the battle of Macledio) but it would seem to have been the innocent blood of horses that alone was shed in this great battle. 'Those who were there' (says Bigli) 'affirm that they heard of no one being killed, extraordinary to relate, though it was a great battle. Philip's army was so completely equipped in armor that no small blow was needed to injure them; nor is there any man who can record what could be called a slaughter of armed men in Italy, though the slaughter of horses was incredible.'"—From Mrs. Oliphant's "*Makers of Venice.*"

"Instances of this are very frequent. Thus at the action of Zagonara, in 1423, but three persons, according to Machiavelli, lost their lives, and those by suffocation in the mud. At that of Molinella, in 1467, he says that no one was killed. Ammirato reproves him for this, as all the authors of the time represent it to have been sanguinary, and insinuates that Machiavelli ridicules the inoffensiveness of those armies more than it deserves. Certainly some few battles of the fifteenth century were not only obstinately contested, but attended with considerable loss. But, in general, the slaughter must appear very trifling. Ammirato

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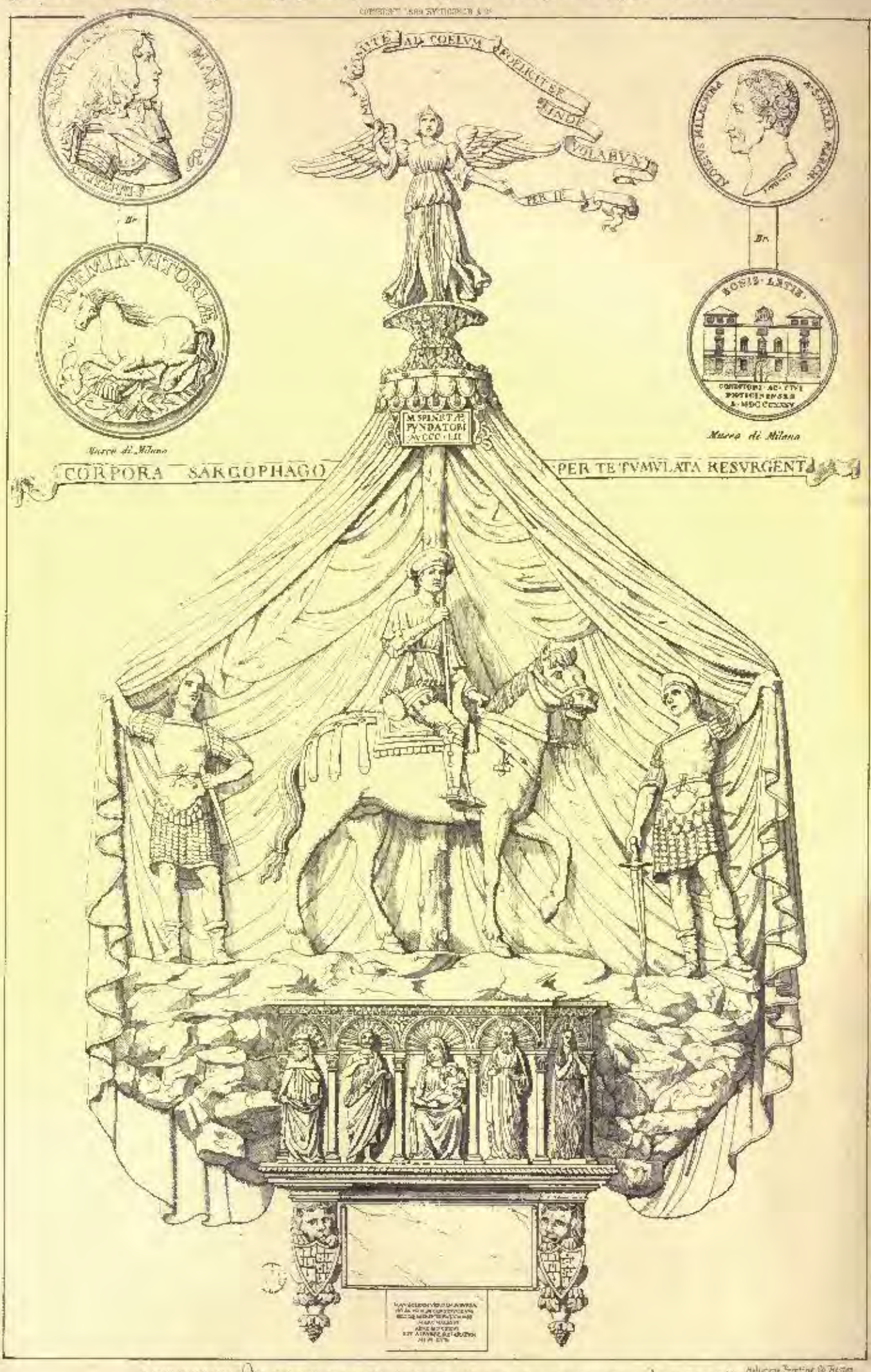

SPINETTA MALA SPINA, S. GIOVANNI IN SACCO VERONA.

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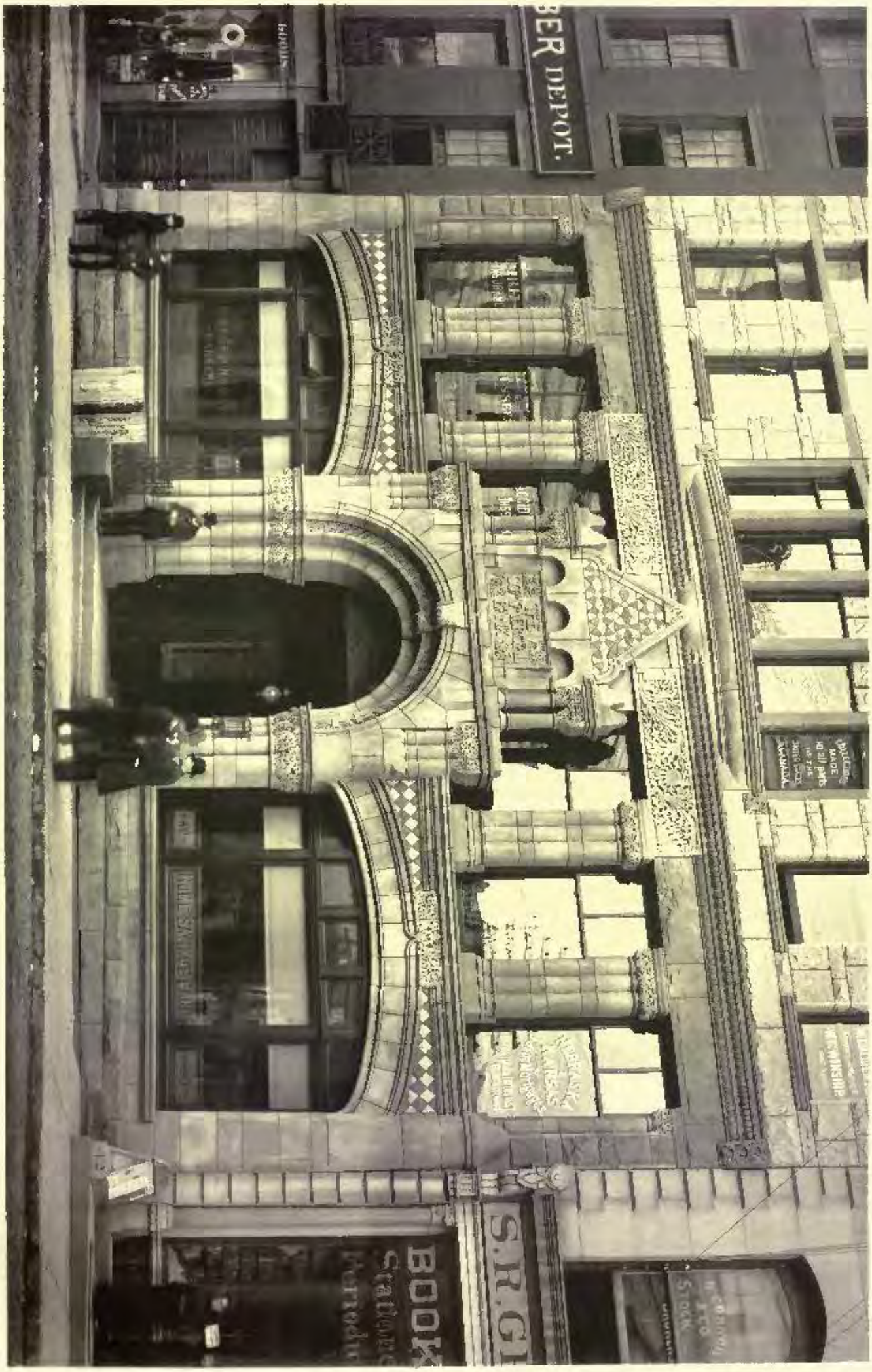

ENTRANCE TO THE COMMERCIAL BANK BUILDING, ALBANY, N. Y.

MR. R. W. GIBSON, Architect.

ARCHITECTURE PART OF VOL. XXVIII

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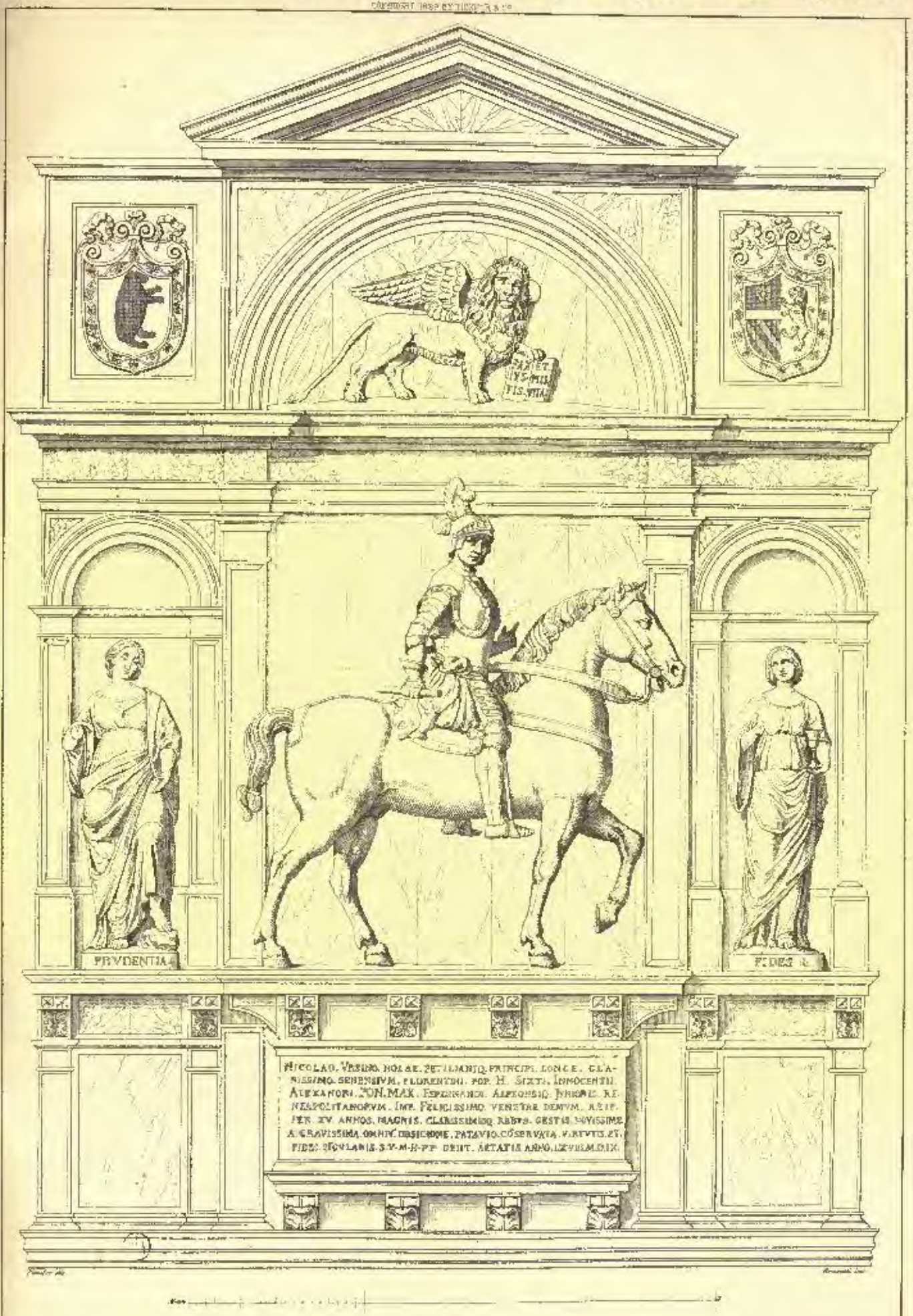
PRVDENTIA
FIDES
NICOLAO. VERNO. HOLAE. PETILIANIQ. PRINCIPI. LONGE. CLARISSIMO. SENENSIVM. FLORENTINI. POP. H. SIXTI. INNOCENTII. ALEXANDRI. ION. MAX. FERDINANDI. ALFONSII. IVNIORIS. REGVM NEAPOLITANORVM. INV. FELICISSIMO. VENETAE. DEMVM. REIP. PER. XV. ANNOS. MAGNIS. CLARISSIMISQ. REBVS. GESTIS. NOVISSIME. A. GRAVISSIMA. OMNIQ. OBSIDIONE. PATAVIO. CONSERVATA. VIRTVTIS. ET. FIDEI. QVOTIANIS. S.V.M.P.P. DEBIT. AETATIS ANNO. LXVIII. M.D.IX.

Monumento di Nicolò Orsini conte di Pitigliano morto nel 1509 nella chiesa di SS. Giovanni e Paolo in Venezia.

NICCOLO ORSINI; S. GIOVANNI E PALOLO, VENICE.

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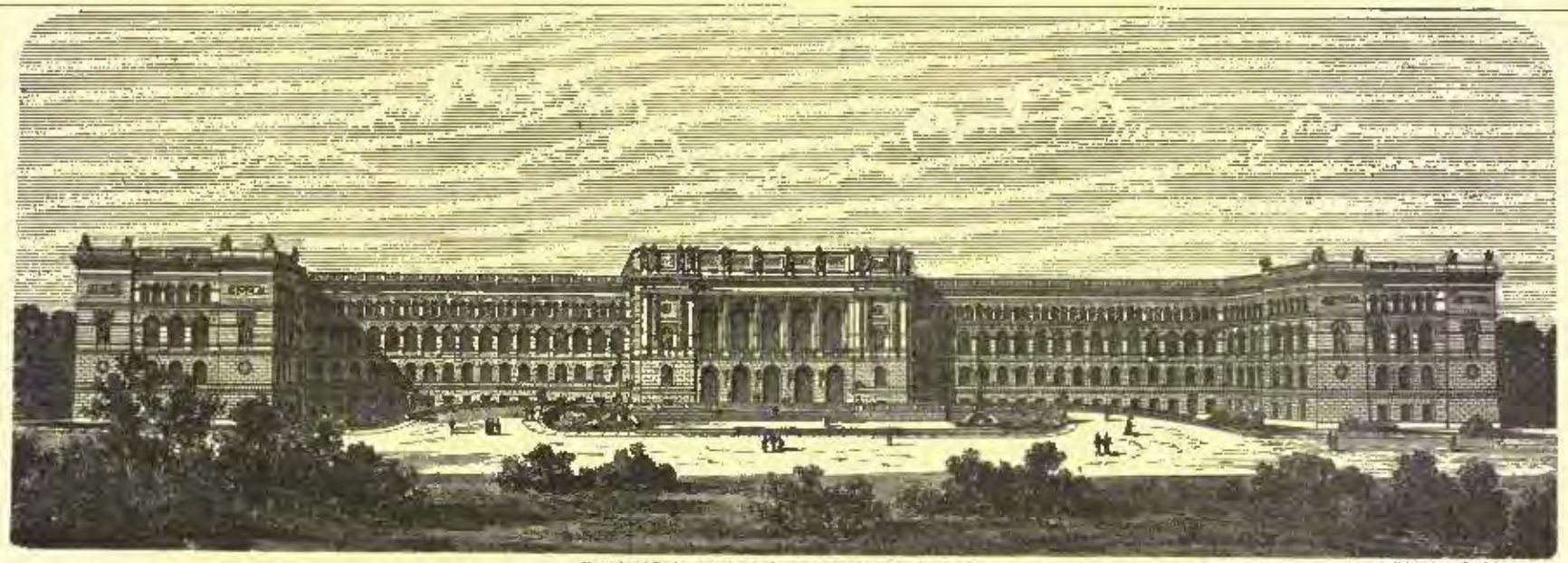
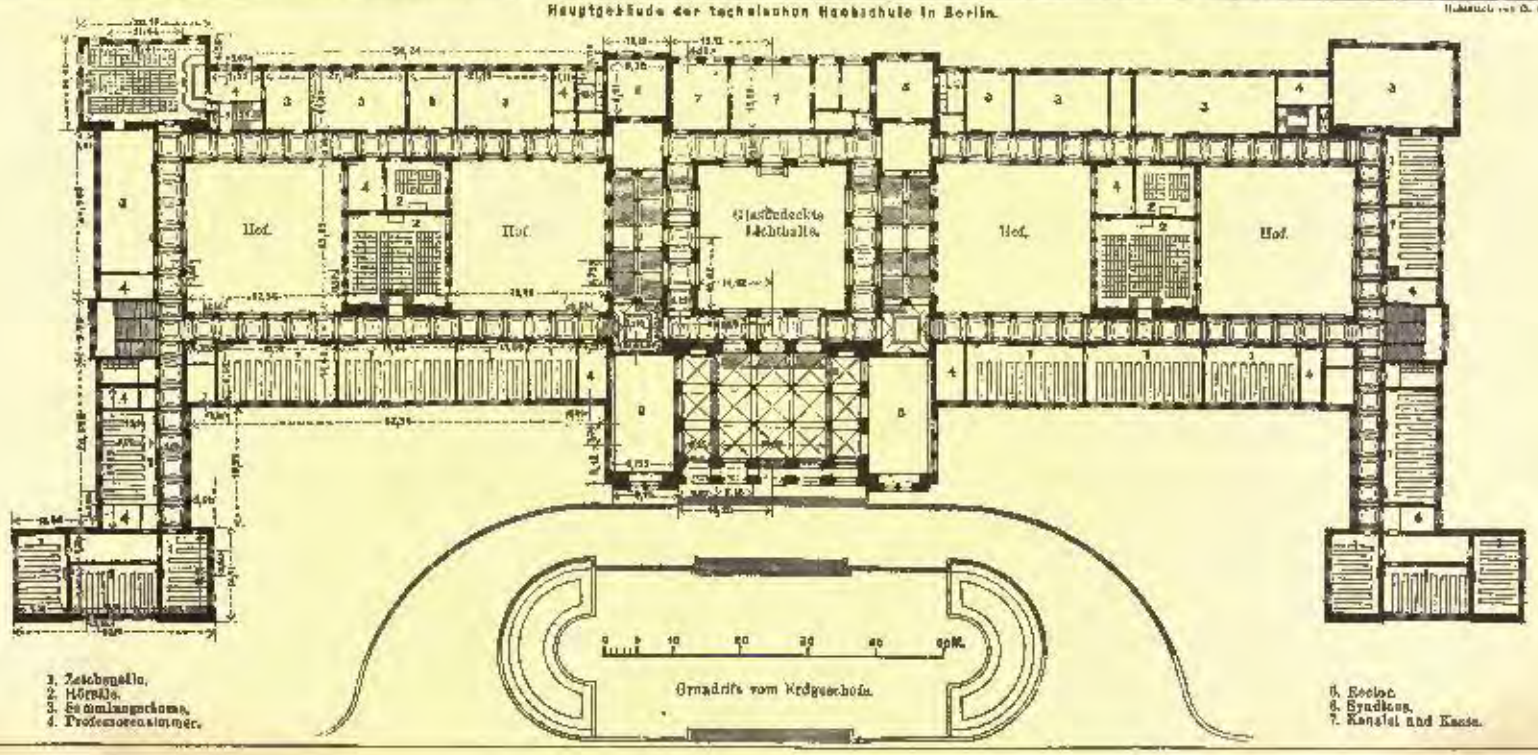


Hauptgebäude der technischen Hochschule in Berlin.



1. Zeichensäle.
2. Hörsäle.
3. Sammlungsräume.
4. Professorenzimmer.
5. Rector.
6. Syndicus.
7. Kanzlei und Kasse.

Heliotype Printing Co. Boston.

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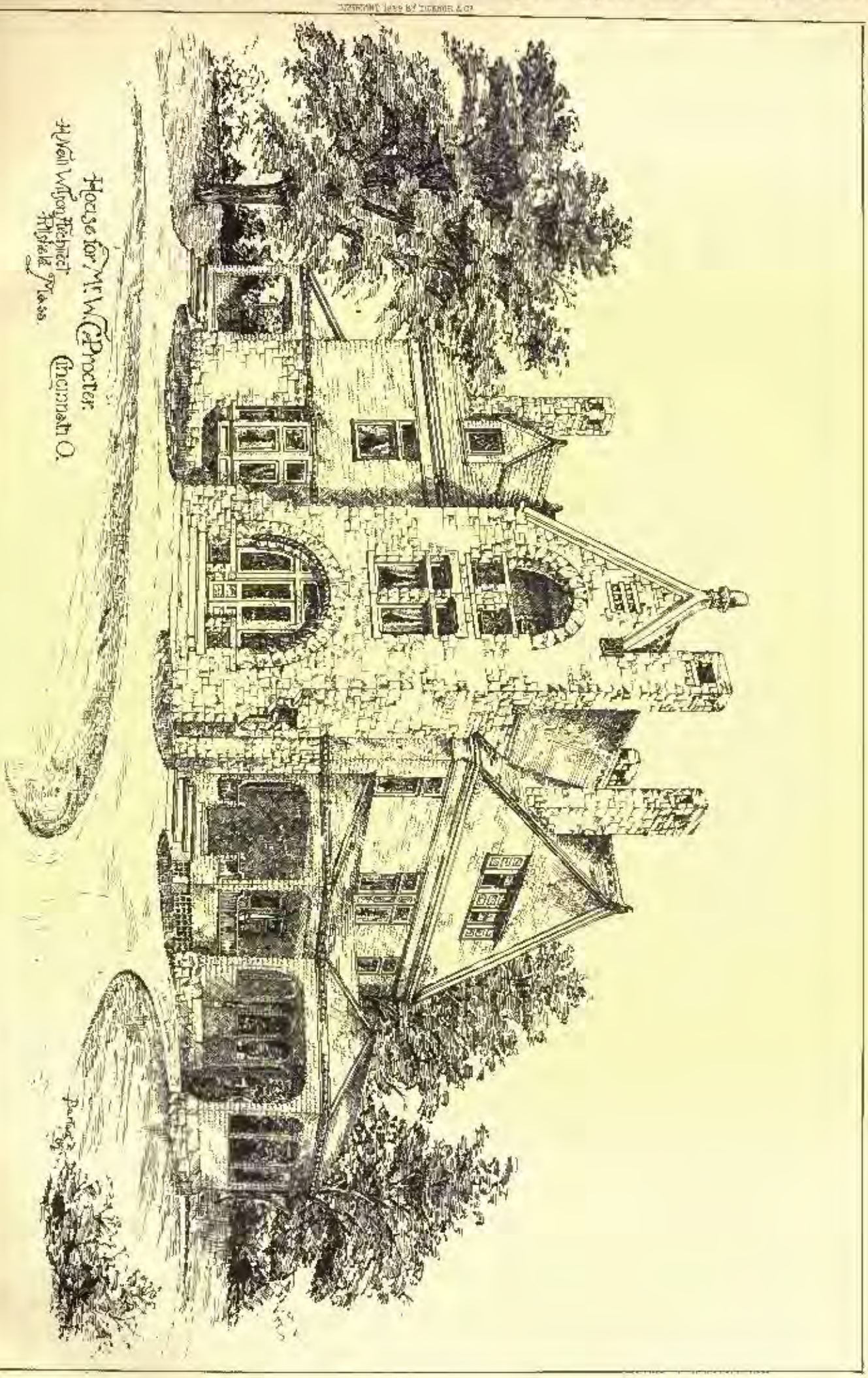


himself says, that in an action between the Neapolitan and Papal troops in 1496, which lasted all day, not only no one was killed but it is not recorded that any one was wounded. Guicciardini's general testimony to the character of these combats is unequivocal. He speaks of the battle of Fornova between the confederates of Lombardy and the army of Charles VIII returning from Naples in 1495, as very remarkable on account of the slaughter, which amounted on the Italian side to 3,000 men." — From Hallam's "*Middle Ages.*"

[To be continued.]

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

ENTRANCE TO THE COMMERCIAL BANK BUILDING, ALBANY, N. Y. MR. E. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

ARMORY, WORCESTER, MASS. MESSRS. FULLER & DELANO, ARCHITECTS, WORCESTER, MASS.

We reprint here the description of this building which by accident was printed in last week's issue.

THE new building, which is to occupy the lot at the intersection of Grove and Salisbury Streets, facing Lincoln Square, is to be built of brick with brownstone trimmings, and is to be 67 by 85 feet, four stories in height. The second and third floors of the headhouse will be for the use of the infantry companies. Each floor will contain two company rooms, 26 by 27 feet, the commissioned officers' rooms occupying the projecting bays at the front, while the rooms for the non-commissioned officers open from the rear. Each company will be provided with all the necessary rooms for uniforms, guns, dressing, etc., on the same floor. The fourth floor is occupied by a kitchen, 15 by 17, a large mess-hall, 27 by 44 feet, with band and drum-corps rooms at the front and a room for a gymnasium at the rear. The basement will be fitted up with dressing-rooms, harness-rooms, lavatories, boiler-rooms, armorer's-room, etc., while the basement under the drill-shed will be used as a magazine. A well-equipped rifle-range, extending through the basements of the headhouse and drill-shed, giving a distance of at least 200 feet, will be one of the features of the new armory. At the rear of the headhouse, and connected with it, is the drill-shed, a partial view of which is given in the cut. This will be only one story high, 75 feet wide, and will extend back from the head-house 160 feet. The roof will be supported by iron arch trusses rising from the floor, which will be entirely unobstructed by pillars or partitions, thus affording an excellent place for drill. A small section, 16 feet wide, will be shut off from the rear end of the shed as a gun park for the artillery. This section is separated from the main hall by gates, which may be raised up out of the way. The entrance to the drill-shed for the artillery will be in the centre of the Salisbury Street side, and the rear corners of the shed will be bastioned and furnished with loop-holes, commanding the sides and rear of the building in case of need. The floors throughout the building will be of hard wood, and the finish will be generally in oak.

EQUESTRIAN MONUMENT TO SIGNETTA MALASPINA.

SEE article on "Equestrian Monuments," elsewhere in this issue.

EQUESTRIAN MONUMENT TO NICCOLO ORSINI.

SEE article on "Equestrian Monuments," elsewhere in this issue.

THE TECHNISCHE HOCHSCHULE, BERLIN, GERMANY.

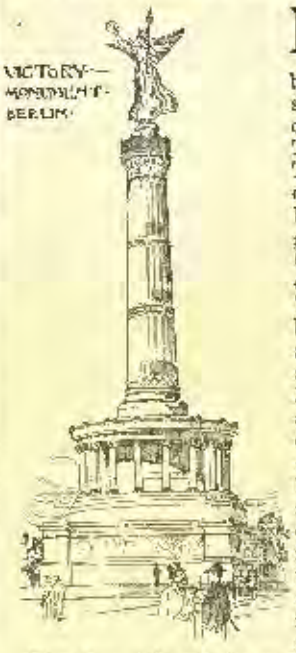
SEE article elsewhere in this issue.

HOUSE FOR W. C. PROCTER, ESQ., CINCINNATI, O. MR. D. KELL WILSON, ARCHITECT, PITTSFIELD, MASS.

THE NEW GATEWAY FOR HARVARD COLLEGE, CAMBRIDGE, MASS. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

A KEG OF NAILS.—A Hartford lady tells this true relation concerning her ancestor, who was a direct descendant of John Eliot, the great missionary and scholar. This lady lived in New Haven, and had occasion to send to Boston for a number of kegs of nails, New Haven at that time (about 1765) not producing these necessaries. In due time the kegs arrived, and, on opening them, it was discovered that one was filled with Spanish dollars. The family wrote to the Boston merchant, telling him that one of the kegs held something more valuable than nails. He replied that he had bought them for nails, and his responsibility therewith ended. Well, they were kept among the family treasures for many years untouched and unclaimed until the death of the head of the house, who, in her will, ordered that they be melted and cast into a communion-service for the New Haven Church, which was done, and it is still probably in use.—*Hartford Courant.*

THE TECHNISCHE HOCHSCHULE OF BERLIN.



VICTORY—MONUMENT—BERLIN.

PROBABLY no other technological educational institution in the world can show a home so palatially beautiful in the grandeur, extent, and site of its buildings as the new quarters of the Technische Hochschule, or Technical High School, of Berlin. The location is a remarkably attractive one, in the suburban city of Charlottenburg. The main buildings front on the great avenue which runs from the Charlottenburg Gate, in Berlin, straight out through the noble old park, the Thiergarten. The grounds comprise a large area, triangular in general shape, and charmingly treated in a park-like style, formal in front but more natural in design at the rear, with paths, trees and shrubbery combining to make a delightful strolling ground for the students. Besides the enormous main building, there is a large and handsome structure devoted entirely to the chemical laboratory, and, standing apart from each other and the other edifices, in the rear, is the building of the technical experimental station and another for the boilers and engines, with the usual tall chimney.

The first sight of the main building, of cheerful creamy-colored stone and its wealth of decoration well-balanced by the uniformity of the long wings connecting the prominent ornamental portions, gives an impression of well-combined richness and simplicity. The unity of the structure, in spite of its great length of 226.66 metres and its uniformity of height, has been admirably maintained. The end-sections are brought forward, forming a half-enclosed great open court in front. The attention is first caught by the conspicuous decorative work enriching these end-sections and is then carried by the graceful repetitions of the long intervening portions of the edifice to the architectural focus of the composition, the central section with the grand entrance, where the whole design blossoms into a beautiful expression of structural dignity supported by an elaboration of sculpture in the shape of statuary, panels of reliefs, medallions and more conventional stone-carving. The contrast of the light color of the stone with the clear, luminous shadows of the harmoniously accented recesses effectively heightens the working of the sculpture. The dominance of this central section is assured mainly by this concentration of decoration. In height it rises but a few feet above the rest of the building, and the quiet emphasis thus given is just sufficient to serve its purpose, without giving an impression of a restless self-assertion. As it is, the effect is that of majestic tranquility. The dignity of the façade is also much enhanced by the design of the approach to the entrance, the broad driveway and walks ascending by a slight grade to a beautiful low terrace, while the broad steps descend directly to the street in a series of three short divisions, across a central depressed space with two fountains.

The sculpture of the exterior is by several of the leading German artists, and its beauty testifies to the high rank in plastic art occupied by Germany to-day. Two niches, on the right and left of the main story of the central section, are occupied by statues of Schlüter and Leonardo da Vinci, and corresponding niches in the terminal sections of the great façades by statues of Bramante and Erwin on the east, and Stephenson and James Watt on the west. The sculptors of these are Hundrieser, Eberlein, Encke and Keil, who also designed the allegorical reliefs crowning the arches of the niches. The central section has also five busts carried on postaments interrupting the balustrade of the main story, between the columns. These are the work of Karl Begas, and represent five masters of art and industrial technique, Gauss, Eytelwein, Schinkel, Reidenbacher and Liebig. Five sculptors shared in the creation of the eighteen gigantic figures that form so prominent a feature of the front and sides of the attic of the central section, Reusch, Hartzer, Herter, Eberlein and Schiller. These figures depict each some branch of architectural or technical handwork, and the idea thus embodied, of illustrating the practical side of technical work, is further carried out in the great reliefs occupying the broad spaces between these figures. These rich compositions are by Otto Lessing. They represent various events in artistic and architectural activity, ending with an illustration of a festival in honor of the completion of a house. The terminal sections of the north façade and the central section of the south façade are crowned with statuary allegorically depicting the sciences, arts and industries, such as astronomy, optics, geometry, art-history, painting, sculpture, commerce, mechanical construction, railway construction, etc. The sculptors of these are Lürsen, Franz, Karl Begas, Moser, Dorn and Schultz. The ornamental sculpture of the façades was designed by Otto Lessing and C. Dankberg.

The talented architects Messrs. Lucae and Hitzig have created an interior worthy of the noble exterior. Color is here a leading element in the effect, working by means of the natural hues of the

materials used, as well as by frescos and colored glass. The coloring is richly reinforced by the use of beautifully executed stucco-work, particularly in the splendidly ornamented rooms for general intercourse, such as the entrance hall, the grand central hall, the stairways and the corridors. As to the impression produced by the interior, I can do no better than quote from a scholarly criticism that appeared in the *Centralblatt der Bauverwaltung*: "In the first degree, on entering, one is fascinated and captivated by the purely architectural effect of these various rooms that unite themselves as one. Adjustment, proportion and apportionment are everywhere so happily dealt with, that in this respect the work has reached the full height attainable with the resources of to-day. The variation in the treatment of the single features of this whole, the combination of the same with each other, and the heightening of expression thereby gained, as well as the perfect designing of all details, betray at the first glance that the creation of mature masters stands before one. The vistas opened out from the grand central hall into the surrounding galleries, from the galleries into the hall, and from the stairways into the hall and into the galleries, are enchanting in the extreme."

As to color, the entrance-hall is kept low in tone; the rest of the interior is maintained in soft, light hues. In the entrance-hall dark granite columns, with bases and capitals of bronze, support a vaulted ceiling with stucco decorations on a strong blue ground. The marble steps leading from this hall into the inner rooms are flanked by two bronze sphynxs modelled by Brütt. The grand central hall comes next, formed by a great court roofed with glass, and it makes a noble impression. The architectural features are here preserved in the light tones of the natural stone. The broad surfaces of the piers in the ground story are painted in tapestry designs and above the arches of these piers are female figures representing various activities of art, construction and technique, supported by boy figures. These symbolize the various branches of instruction taught in the building. The figures are in monochrome, light gray on a yellow ground, and are by M. von Becherath. In the two stories above stand double rows of dark granite columns, standing in pairs, one behind the other; their bases and capitals imitate bronze, the spaces above the arches are painted in yellow and gray, with medallions, one series composed of the faces of artists, and the other of the arms and names of leading German cities; the ground-work of these is blue. The skylight is composed, in its main surface, of green glass, leaded in appropriate patterns; the surrounding frieze is composed of a glass mosaic of brilliant colors. From the centre there hangs a great sun-burner of decorative design. The vaulted ceilings of the galleries surrounding the hall are painted in two alternating colors. The grand stairways are splendid with columns of granite and marble, balustrades of bronze with fields of wrought-ironwork, and vaulted ceilings of basket-arches with handsome stucco-work. There are some handsome groups of statuary in the grand central hall, including the bronzed cast of the figure of Beuth made by Rauch, and that of Schinkel by Wiese, for the monument at Neuruppin.

Another splendid room is the aula, or grand auditorium. The walls are divided by pilasters of stucco beautifully counterfeiting red marble, and animated colors predominate on the walls and ceiling. Surrounding the hall, in the fields of the arches occupying the upper portion of the walls, there are nine architectural paintings by Spangenberg, Jacob and Körner, representing famous architectural monuments of successive periods: the Parthenon and Acropolis at Athens, the Ruins of Pæstum, San Apollinare in Classe near Ravenna, the church at Laach, the Elizabeth Church at Marburg, the Marienburg in West Prussia, St. Peter's and the Arch of Titus in Rome, and the ruins of Pilila.

The rich collections of the institution, consisting of casts, models, drawings, etc., belonging to the various departments of technical activity, form a large and instructive museum. Several rooms are devoted to the "Schinkel Museum," containing a large collection of the drawings and models illustrating the manifold works of that great and versatile architect. By the way, would not a Richardson museum on a similar plan be an admirable feature of the Massachusetts Institute of Technology?

The corridors are largely occupied by the rich collection of ornamental casts from the former Bauakademie and the Gewerbeakademie. It is divided into sections representing respectively the Greek, Roman, Byzantine, Moorish, Romanesque, Gothic and Renaissance periods.

The great building encloses four open courts of comparatively simple architecture, their walls in yellow and brownish brick, with details of sandstone and bands of sgraffito, partly decorative and partly with figures, the former work by Essdorf and the latter by Otto Lessing.

The chemical laboratory has a handsome exterior, harmonizing with that of the main building, but not so elaborate. The interior is plain, but admirably adapted to its purpose of affording the best possible opportunities for the most thorough instruction and investigation in all branches of the science. Among the interesting objects to be seen here is a collection of the work by Professor Vogel, the famous expert and experimenter in photography, who is at the head of the photographic department.

The Technische Hochschule was formed in 1879 by the union of the Bauakademie and the Gewerbeakademie, or, in English, the Academy of Construction and the Academy of Industry. The origin of the former antedates the latter by over a century, for in 1699 the Prince Elector of Brandenburg, Frederic III, founded the Academy of Arts, comprising instruction in architecture as well as in painting and sculpture. Since, however, architecture could find little consideration in such an institution except as a fine art, and its technical aspects were neglected, it was found desirable to establish a separate institution, and on March 18, 1799, King Frederic William III authorized the establishment of the Bauakademie with its declared objects consisting of "the theoretical and practical education of able surveyors, civil and hydraulic engineers, and also handworkers for building, chiefly for the royal states, although foreigners may be admitted in so far as it may occur without detriment to the interests of natives." The course of instruction embraced twenty-three separate studies at the start. It was required that the students should visit the royal edifices of the city under the guidance of a teacher in order to receive practical illustration of their studies. The minimum age for architectural students was fifteen years. The requirements for entrance were a good readable handwriting and an orthographically correct composition, a fundamental knowledge of Latin and French, and a ready knowledge of the arithmetical principles necessary in common life. The term for students of surveying was a year and a half, for students of architecture, two years and a half. This was the first institution of the kind in Germany, and, with the exception of the Ecole Polytechnique, founded in Paris in 1794, the first in Europe. In 1801 the number of students was fifty-nine, including eleven foreigners. The institution first occupied the upper story of the Mint, and in 1832 the erection of a special building on the Werdersehen-Markt was begun after a design by Schinkel, in brick.

A word about the origin of the Gewerbeakademie. After the examples of the Polytechnic Institutes established in Prague in 1806, and in Vienna in 1815, Prussia founded in 1821 the "Technische Schule" in Berlin — an institution quite different from that understood under the word "Polytechnicum" to-day. The age for admission was from twelve to fifteen years. The instruction for the lower classes consisted of geometry, arithmetic, natural philosophy, drawing and, for some, modelling. For the upper class, arithmetic and algebra, geometry, stereotomy, perspective, trigonometry, statics and mechanics, mechanical construction and technology, and theoretical chemistry. A mechanical workshop was early connected with the institution. In 1827 its name was changed to Gewerbe-Institut, and in 1866 it was again changed to Gewerbe-Akademie.

In 1876 the union of the two institutions was decided upon under the name of "Die Königliche Technische Hochschule zu Berlin," or the Royal Technical High-School of Berlin. The preparations were not completed until 1879, from which time the present magnificent institution dates its foundation. The rules of the institution require for the admission of a German the presentation of a certificate of graduation from a German gymnasium or Prussian real-gymnasium (real-school of the first degree) or a Prussian upper real-school (industrial school with a nine years' course and two foreign languages). There are five departments: architecture, civil engineering, mechanical engineering, including ship-building, chemistry and mining, and a general scientific course, with mathematics and natural science in particular. The various courses have no binding force for the students, but are designed to serve as a guide for them in obtaining the instruction they desire. As in the universities of Germany, so in the Technical High-School, or, more correctly, University — *hochschule* and *universität* being synonymous in German — there is complete freedom of study, every student being at perfect liberty to study how, when or what he may choose, the entire responsibility being placed upon him as to whether he shall take advantage of the opportunities so freely set at his disposal. The German system is known by its fruits, and by these it may be judged whether the custom of regarding the student as a responsible man is not superior to the English and American custom of continuing the school-boy and school-master policy into the higher seats of learning.

The government of the institution consists of a rector and senate, and a "syndicus" for the administration of the financial affairs. Each department forms an independent entity, with its internal affairs administered by a chairman and the members of its faculty. The rector is elected every year by the collective faculties, the choice being formally ratified by the King. The students have, also, the privilege of attendance at the lectures of the University of Berlin.

The splendid buildings at Charlottenburg were finished in 1884, and dedicated with elaborate ceremonies and festivities on November 1 and 2 of that year. Their cost was 8,150,000 marks, or over $2,000,000. To duplicate them in this country, it would probably require at least considerably more than double that sum.

In the winter of 1885–86 there were 662 regular students and 368 "*Hospitanten*," or unmatriculated students, making a total of 1,030. The present total number is something like 1,200. The instruction-corps consists of regularly appointed professors, named by the King "*Docenten*" and "*Privat docenten*," or instructors and unofficial instructors. The latest statistics gave the number of professors and instructors as 57, and of unofficial instructors as 24. There is a considerable number of stipendiums, or scholarships, provided by the State, and also by the provinces, municipalities, various schools, and private individuals, mostly consisting of sums of 600 marks annually, and with other amounts from 300 marks upwards. Most of the scholarships also carry the privilege of freedom from the payment of instruction-fees, and, moreover, six per cent of the students are also absolved from the same. The Louis Boissonet scholarship for

architects and civil engineers yields an annual income of something like 3,000 marks, or about $750, which is annually given alternately to an architect and a civil engineer who have received the greater part of their training at the institution, in very much the same manner as the Rotch scholarship here; that is, with the condition that the recipient shall use the money in undertaking a journey connected with a professional task, and shall submit a report concerning the same. There are also two travelling-scholarships of 1,500 marks each for students of Divisions III and IV, respectively, mechanical engineering and ship-building, and chemistry and mining, who have distinguished themselves at their diploma-examination. From the income of the Von Seydlitz scholarship-fund — a sum annually fixed by the Curator — at present about 2,300 marks, is awarded as a prize to a student of one of the aforementioned two divisions who, in the diploma-examinations of the previous year, has specially distinguished himself. For each division, and also the ship-building section, a prize-problem is set, with 300 marks and a silver medal for the best solution, and a silver prize-medal for the second-best solution.

The Technische Hochschule includes the following collections and institutes:

The Physical Collection, containing all the apparatus necessary in the courses on experimental physics, and is particularly rich in instruments relating to optics and electricity.

The Kinematic Collection contains 590 models, comprised in two divisions, one illustrating the control of motion, and the other the transmission of motion.

The Electro-technical Laboratory affords the students an opportunity to familiarize themselves with the practice of electrical measurements.

The Geodatic Collection is devoted exclusively to means for instruction.

The Mineralogical Institute comprises, besides its lecture-halls, the laboratory for crystallographic-physical and chemic-mineralogical researches, a mineralogical collection for instruction, a geological collection for instruction, and the mineralogical museum.

The Chemical Laboratory comprises a laboratory for inorganic chemistry, another for organic chemistry, a metallurgical laboratory, a laboratory for technical chemistry, and a photochemical laboratory.

The Royal Mechanic-technical Experimental Institution is designed for the testing of all materials used in technical work, with the exception of specifically building materials. Among the apparatus are two testing-machines of the Werder & Martens pattern, with a power of 100,000 and 50,000 kilogrammes respectively. Among the great tasks now in hand are an investigation of railway material at a cost of about 60,000 marks, the experiments lasting about two and a half years, and an investigation of the native woods of Prussia, the cost of the preliminary experiments being about 4,000 marks; both of these are carried on in behalf of the Ministry of Public Works. In behalf of the Ministry of Commerce there is being conducted an investigation of the products of the German and foreign wire-manufacturing industries, lasting about two years, and costing about 4,000 marks; and an investigation of German and foreign lubricating oils, at a cost of about 3,500 marks for preliminary experiments. There are also various scientific investigations in hand in the interest of societies and of the institution itself, such as the conduct of plastic masses under pressure on all sides, the sweating of powder-form substances under high pressure, microscopic investigations of structural changes in metals under tests of strength, etc.

The Royal Testing-station for Building Materials was established in 1871, particularly for the purpose of deciding disputes concerning the worth of cements. The station has apparatus for testing the strength and other physical properties of burnt and unburnt artificial stones. The hydraulic press can exert a power of 14,000 kilogrammes. Among the means for testing cements are sieves with 600, 900 and 5,000 meshes to the square-centimetre.

SYLVESTER BAXTER.

THE ELECTRICAL TREATMENT OF SEWAGE.

WHERE is a universal consensus of opinion in large towns, and in a good many small ones too, that "something must be done" with the sewage other than turning it into the nearest stream. In many places "something" has been done; the results have always been costly, and we have yet to learn that they have ever been quite satisfactory. In the metropolis vast sums have been spent and are still being laid out upon works for carrying on the precipitation process introduced by Mr. W. J. Dibdin, the chemist to the late Board of Works. This process consists in the precipitation of the solids in the sewage by the addition of 8.7 grains of lime and one grain of sulphate of iron to each gallon of fluid. By this means the matter in suspension is precipitated as mud; the clear liquid is allowed to flow into the river, while the sludge is carried out to sea by steamers and deposited in deep water. There are plenty of chemists who do not hesitate to declare positively that these quantities of chemicals are quite insufficient to produce a satisfactory effluent, and that if they are not increased the condition of the Thames will undergo no amelioration. Experience only can decide this point; the works are being built and the exact method to be followed remains to be determined. It is to the interest of Londoners that the river should be rescued from its present state of filth, and that it should be done as cheaply as is compatible with efficiency.

Among the many processes of sewage purification which are being offered for adoption at the new works by the London County Council, none appears to be more promising than that of Mr. William Webster, of 8 St. Martin's-place, Trafalgar-square. An experimental plant, capable of treating 1,000,000 gallons of sewage per day, has been erected at Mr. Webster's expense, at the South Metropolitan outfall of Crossness, and for more than twelve months trials have been conducted there on a scale corresponding to the requirements of a fair-sized town. These trials have certainly demonstrated the efficacy of the process, and so far as their size and intermittent character would permit, they have shown it to be economical. The method followed is to electrolyse the sewage between iron electrodes. The chemical reactions have not yet been very clearly ascertained, but the nascent chlorine and the oxygen are carried to the positive electrode, probably in the form of hypochlorous acid, the strongest disinfectant known, and there they rapidly oxidize the organic matter. The iron is also dissolved as a hypochlorite, and combining with the suspended matter, coagulates it in flocculent particles. These are buoyed up by the hydrogen bubbles, and rise to the top as froth, leaving clear liquid beneath. If the treated sewage be run into a tank and allowed to remain there for two hours, the hydrogen gradually disengages itself, whereupon the coagulated particles subside to the bottom as sludge, and the liquid can be run off. It is found on analysis that the amount of iron dissolved is equal to 2 grains per gallon treated. The matter in suspension, as shown by the following Table, is nearly all removed, while the free ammonia and albuminoid matter are very sensibly reduced. Any one may try the experiment for himself in a beaker glass with a sample of sewerage, and a pair of iron electrodes having a difference of potential of 2½ volts; in a very few minutes the organic matter is rendered flocculent, and an hour sees it precipitated.

THE ELECTRICAL TREATMENT OF SEWAGE. — ANALYSES OF EXPERIMENTS, 1888-9. PARTS PER 100,000.

	APPEARANCE.	Odor.	Nitrogen as			Oxygen required to Oxidize Organic Matter.	Suspended Matters.		
			Free Ammonia.	Albuminoid Matter.	Chlorine as Chlorides.		Total.	Mineral.	Organic.
(A)	Raw sewage, very turbid & opalescent	Bad	3.57	0.6	14.61	4.03	14.62	5.05	8.57
	Effluent, clear....	None	2.9	0.25	13.30	1.34	1.48	1.06	0.43
(A)	Raw sewage, very turbid & opalescent	Very bad	1.99	0.51	29.5	2.87	18.43	7.43	5.90
	Effluent, clear....	None	1.8	0.23	29.0	1.21	2.20	1.91	0.29
Average of 20 analyses	Raw sewage, very turbid & opalescent	Slight	4.31	0.5	21.64	1.21	33.30	not estimated.	
	Effluent, clear....	None	3.22	0.2	18.02	0.82	1.50	not estimated.	

(A) Time of settlement one hour in open reservoirs.

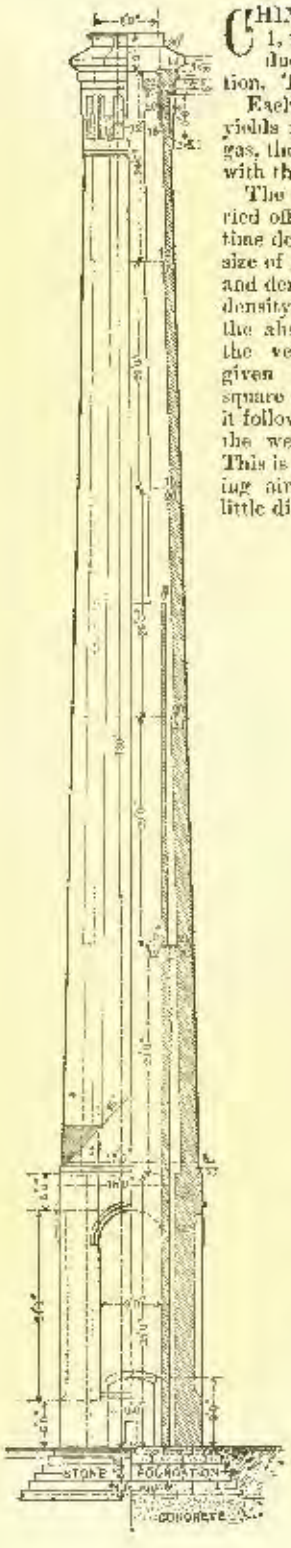
At Mr. Webster's works the raw sewage, as it is received from London, is lifted into a tank, from which it flows through a long inclined channel to a settling reservoir. In this channel there are a large number of iron plates arranged in groups. All the plates in each group are parallel to each other and to the sides of the channel, the sewage flowing between them in streams about an inch wide and the depth of the channel. The plates are alternately positive and negative, the difference of potential being 2½ volts. The dynamo delivers current at a pressure of 20 volts, and six groups of plates are arranged in series. The time a particle of sewage is occupied in passing through the entire length of the channel varies, according to the degree of its pollution, from two to ten minutes. It is estimated that on the average it requires .25 ampère hour of current for each gallon treated, the current density being 1 ampère per 11 square feet of electrode.

No positive estimates of cost have yet been made. The sole working expenses are for coal, iron and labor; and it is calculated that these will amount to 13s. per million gallons of London sewage, if treated on a large scale. Interest and depreciation of plant have to be added to this, and all the labor of dealing with the sludge. According to the Metropolitan Board of Works, it costs 6d. per ton to discharge this into the sea and about 1s. 6d. per ton to press it. In a town of 333,000, having a sewage discharge of 30 gallons per head, the mechanical power required is estimated at 264 horse-power and the expenditure of iron at 464 tons per annum. This latter is in the form of plates, 1 inch thick, run directly from the blast furnace.

There is a charming simplicity about Mr. Webster's process. He manufactures his chemicals to a great extent out of the sewage itself, and he uses them in the nascent state where it is well-known they are most powerful. Instead of adding 5, 10, 12, or 15 grains per gallon of solid matter, as is now done, he only adds two, and he not only precipitates the matters in suspension, but he also removes some of the organic matter in solution. This latter is an important matter, as it defers the second decomposition so long that the effluent may be

carried down to the sea, or oxidized by natural influences, before it can occur. The extent to which the purification can be carried is merely a matter of time, and in hot weather, when the quantity of sewage is reduced, and is consequently fouler, it can be allowed to remain for a longer period in the electrolytic bath. — *Engineering.*

CHIMNEYS.[1]



CHIMNEYS are required for two purposes: 1, to carry off obnoxious gases; 2, to produce a draught, and so facilitate combustion. The first requires size, the second height.

Each pound of coal burned yields from 13 to 30 pounds of gas, the volume of which varies with the temperature.

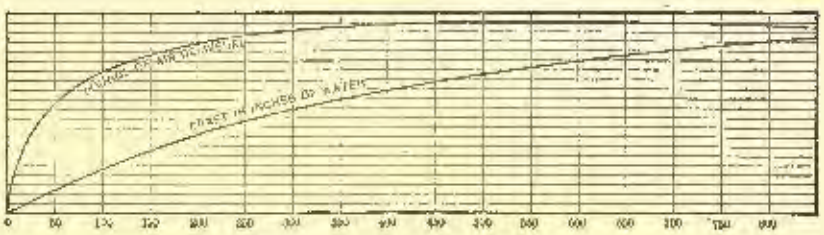
The weight of gas to be carried off by a chimney in a given time depends upon three things: size of chimney, velocity of flow and density of gas. But as the density decreases directly as the absolute temperature, while the velocity increases with a given height, nearly as the square root of the temperature, it follows that there is a temperature at which the weight of gas delivered is a maximum. This is about 550 degrees above the surrounding air. Temperature, however, makes so little difference, that at 550 degrees above, the quantity is *only four per cent* greater than at 300 degrees. Therefore, height and area are the only elements necessary to consider in an ordinary chimney.

The intensity of draught is, however, independent of the size, and depends upon the difference in weight of the outside and inside columns of air, which varies nearly as the product of the height into the difference of temperature. This is usually stated in an equivalent column of water, and may vary from 0 to possibly 2 inches.

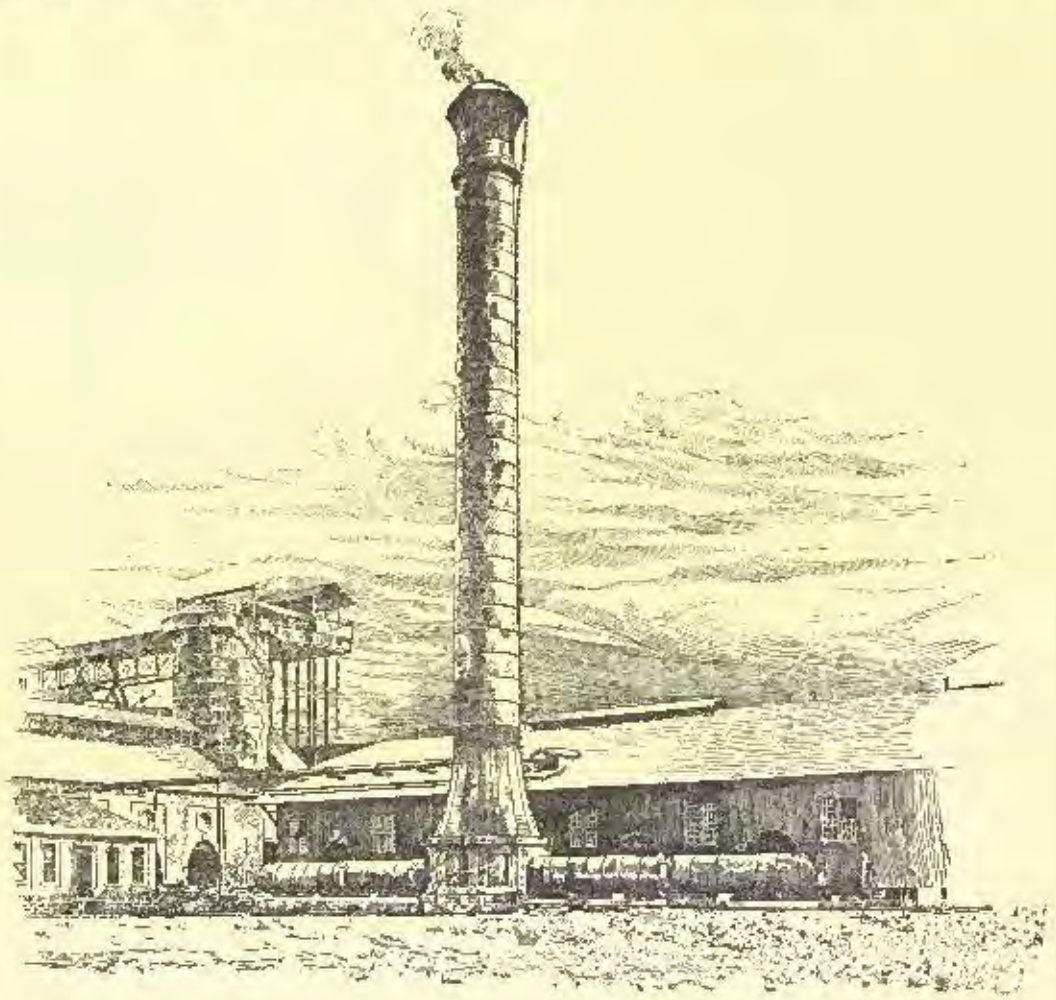
After a height has been reached to produce draught of sufficient intensity to burn fine, hard coal, provided the area of the chimney is large enough, there seems no good mechanical reason for adding further to the height, whatever the size of the chimney required. Where cost is no consideration there is no objection to building as high as one pleases; but for the purely utilitarian purpose of steam-making, equally good results might be attained with a shorter chimney at much less cost.

The intensity of draught required varies with the kind and condition of the fuel, and the thickness of the fires. Wood requires the least, and fine coal or slack the most. To burn anthracite slack to advantage, a draught of 1½ inch of water is necessary, which can be attained by a well-proportioned chimney 175 feet high.

Generally a much less height than 100 feet cannot be recommended for a boiler, as the lower grades of fuel cannot be burned as they should be with a shorter chimney.



A round chimney is better than square, and a straight flue better than a tapering, though it may be either larger or smaller at top without detriment.



The effective area of a chimney for a given power, varies inversely as the square root of the height. The actual area, in practice, should be greater, because of retardation of velocity due to friction against the walls. On the basis that this is equal to a layer of air two inches thick over the whole interior surface, and that a commercial horse-power requires the consumption on an average of 5 pounds of coal per hour, we have the following formulæ:

$$E = \frac{0.3\,H}{\sqrt{h}} = A - 0.6\sqrt{A} \quad . \quad . \quad 1$$

$$H = 3.33\,E\sqrt{h} \quad . \quad . \quad . \quad . \quad . \quad . \quad 2$$

$$S = 12\sqrt{E} + 4 \quad . \quad . \quad . \quad . \quad . \quad . \quad 3$$

$$D = 13.54\sqrt{E} + 4 \quad . \quad . \quad . \quad . \quad . \quad 4$$

$$h = \left(\frac{0.3\,H}{x}\right)^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad 5$$

[1] Extract from "Steam," a book which can be procured of the Babcock & Wilcox Company of New York, without cost.

in which H = horse-power; h = height of chimney in feet; E = effective area, and A = actual area in square feet; S = side of square chimney, and D = diameter of round chimney in inches.

To find the draught of a given chimney in inches of water: *Divide 7.6 by the absolute temperature of the external air* ($T_a = t + 460$); *divide 7.9 by the absolute temperature of the gases in the chimney* ($T_c = t' + 460$); *subtract the latter from the former, and multiply the remainder by the height of the chimney in feet.* This rule, expressed in a formula, would be:

$$d = h\left(\frac{7.6}{T_a} - \frac{7.9}{T_c}\right).$$

To find the height of a chimney, to give a specific draught-power, expressed in inches of water: *Proceed as above, through the first two steps, then divide the given draught-power by the remainder*, the result is the height in feet. Or, by formula:

$$h = \frac{d}{\left(\frac{7.6}{T_a} - \frac{7.9}{T_c}\right)}$$

To find the maximum efficient draught for any given chimney, the heated column being 600 Fahrenheit, and the external air 62 degrees: *Multiply the height above grate in feet by .007, and the product is the draught-power in inches of water.*

The above diagram shows the draught, in inches of water, for a chimney 100 feet high, under different temperatures, from 50 degrees to 800 degrees above external atmosphere, which is assumed at 60 degrees. The vertical scale is full-size, and each division is $\frac{1}{10}$ of an inch. It also shows the relative quantity, in pounds of air, which would be delivered, in the same time, by a chimney under the same differences of temperature. It will be seen that practically nothing can be gained by carrying the temperature of the chimney more than 350 degrees above the external air at 60 degrees.

To determine the quantity of air, in pounds, a given chimney will deliver per hour, multiply the distance in inches, at given temperature, on the diagram, by 1,000 times the effective area in square feet, and by the square root of the height in feet. This gives a maximum. Friction in flues and furnace may reduce it greatly.

The external diameter of a brick chimney at the base should be one-tenth the height, unless it be supported by some other structure. The "batter" or taper of a chimney should be from $\frac{1}{8}$ to $\frac{1}{4}$ inch to the foot on each side.

Thickness of brickwork: one brick (8 or 9 inches) for 25 feet from the top, increasing $\frac{1}{2}$ brick (4 or 4½ inches) for each 25 feet from the top downwards.

If the inside diameter exceed 5 feet the top length should be 1½ bricks, and if under 5 feet it may be ½ brick for 10 feet.

SOCIETIES

THE architects of Philadelphia gave a dinner to the lately appointed United States Supervising Architect, James H. Windrim, at the Hotel Bellevue, Philadelphia, on Saturday evening, April 20, 1889. Owing to the date only the following were in attendance: Messrs. T. Roney Williamson, John Stewardson, Frank Miles Day, Amos J. Boyden, R. G. Kennedy, Guy King, W. B. Powell, John J. Deery, Wilson Eyre, Jr., C. Balderston, Oscar Frotscher, Walter Cope, Lindley Johnson, Thomas Lonsdale, John Ord, Grayson P. MacArthur and John T. Windrim, the eldest son of the guest. Mr. T. P. Chandler presided, and after the *menu* had been about half discussed, he introduced the guest of the evening in unusually brief, though well-chosen words. Mr. Windrim evidently felt the compliment of the occasion, and referred in feeling terms to the invitation of his professional brothers and to the letters of congratulation he had received from his comrades here on his appointment. He then rapidly sketched his connection with his old master, John Notman; the duties of the Supervising Architect of the Treasury Department; his hopes of lifting the office from politics to a plane of business and artistic excellence, and referred humorously to some of the petty troubles which such an official daily encounters. His impromptu remarks were liberally applauded by his colleagues, particularly where he spoke with great earnestness of his intention to appoint men of mechanical and technical knowledge to positions of superintendents and supervision, instead of the recent crop of ward politicians and men utterly unfamiliar with the work in hand.

Mr. Frotscher, after making extended remarks upon the Palais de Justice, Bruxelles, said Americans were in advance in original work. Mr. John Ord, in speaking of the development of the art in America, knew that the honored guest would give as high a character to the æsthetic requirements of his trust as to other departments. Mr. T. Roney Williamson made pleasurable remarks and Mr. John J. Deery dilated upon the benefit of re-unions of architects. Mr. Wilson Eyre, Jr., made complimentary remarks, and referred to his hurried trip in the Appenines during the early winter. Mr. Walter Cope gave a sketch of his tricycle sketching tour in Normandy. Mr. John Stewardson, Mr. R. G. Kennedy, Mr. Guy King, Mr. W. B. Powell, Mr. Lindley Johnson, Mr. Thomas Lonsdale, Mr. Grayson P. MacArthur, Mr. Amos J. Boyden, Mr. John T. Windrim and Mr. Frank Miles Day were at their best with salutations, which were highly gratifying to Mr. Windrim.

It is proper to state that Mr. T. Roney Williamson was Chairman, and Mr. Frank Miles Day was Secretary of the Committee which brought about this fraternal meeting of gentlemen devoted to the best interests of a great people. The parting was as generous as the reception, and will be long remembered by all the participants.

THE ARCHITECTS' CLUB OF ST. LOUIS.

I ENCLOSE a copy of the Constitution and By-Laws of the Architects' Club of St. Louis, which has just been formed with a membership of fifteen. The Executive Committee for the first year are: President, F. P. Furber; Secretary, L. C. Bulkley; Treasurer, A. F. Rosenheim. The Committee thought you might like to know that St. Louis was trying to keep up with the procession.

Very truly yours, F. P. FURBER.

St. Louis, April 18, 1889.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

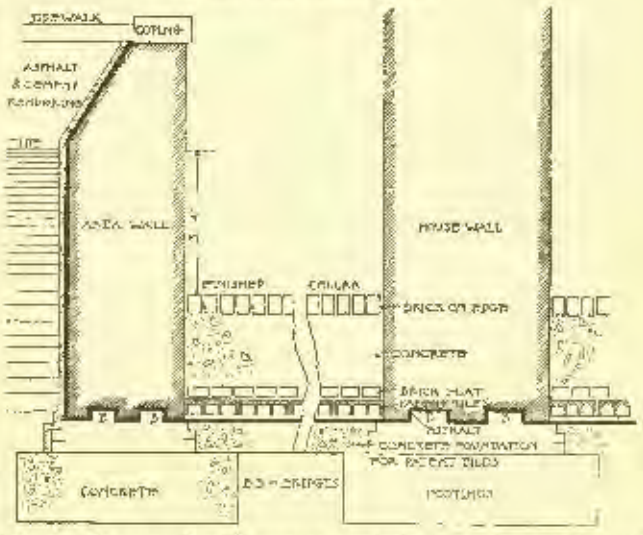
HOW TO MAKE A CELLAR WATER-TIGHT.

NEW YORK, N. Y., April 18, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, Instead of lining the *inside* of walls with asphalt for preventing the ingress of water, I have found that the best method was to build the cellar wall as per sketch and place the asphalt

TO MAKE A WATER-TIGHT CELLAR



(afterwards covered with cement rendering) on the *outside*. This has been tried successfully in several warehouses on West Street, New York City, for the Rhinelander and Renwick Estates and by so doing valuable cellar-space was saved and the weight of the wall utilized for resisting tide pressure. In one instance the cellar floor was 8′ 4″ below high-tide level. The use of a part of the floor is patented. The suggestion about asphalt is for professional use.

Yours faithfully, GEORGE MARTIN HUSS.

A BOOK FOR A BEGINNER.

INDIANAPOLIS, IND., April 22, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Please state in the next issue of the *American Architect* a good work on general construction for a beginner. Also state where same can be purchased, and oblige R. E. O'BRIEN.

["*Building Superintendence*," by T. M. Clark. Tickner & Company, publishers.—EDS. AMERICAN ARCHITECT].

NOTES & CLIPPINGS

NEW PROCESS OF HARDENING PLASTER-OF-PARIS.—The French Academy of Sciences has just received a communication from M. Julte on a new process of hardening plaster so as to adapt it to the construction of flooring in place of wood, and to other purposes for which it cannot be used in its ordinary state on account of its want of hardness and resistance to crushing. M. Julte recommends the intimate mixture of six parts of plaster of good quality with one part of finely sifted, recently slaked white lime. This mixture is employed like ordinary plaster. After it has become thoroughly dry, the object

manufactured from it is saturated with a solution of any sulphate whatever whose base is precipitated in an insoluble form by lime. The sulphates best adapted for the purpose, from every point-of-view, are those of iron and zinc. With sulphate of zinc, the object remains white, as might be supposed. With sulphate of iron, the object, at first greenish, finally assumes, through desiccation, the characteristic tint of the sesquioxide of iron. The hardest surfaces are obtained with iron, and the resistance to breakage is twenty times greater than that of ordinary plaster. In order to obtain a maximum of hardness and tenacity, it is necessary to temper the lined plaster well in as brief a space of time as possible, and with no more water than is strictly necessary. The object to be hardened should be very dry, so that the solution employed may penetrate it easily. The solution should be near the point of saturation, and the first immersion should not exceed two hours. If immersed too long, the plaster would become friable. The proportion of the lime and plaster are arbitrary, and may be varied according to the results to be obtained; nevertheless, the proportions of one to six have given the best results. As it is important that the plaster should not be spread over the surface by passing and repassing the trowel for too long a time, the fastest workman should always be the best one to employ. When sulphate of iron is used, the slabs are of the color of iron-rust; but if linseed oil boiled with litharge be passed over the surface they assume a beautiful mahogany color, and offer a certain superficial elasticity to the tread. If a coat of hard copal varnish be added, the color becomes very beautiful. On spreading a two or three inch layer of lined plaster in a room, and treating it in the way above described, we obtain a floor which is as smooth as a mirror, and which, in most cases, fulfils the office of an oak floor, but which has the advantage over the latter of costing four times less.—*Invention.*

Rock-Paintings in West Virginia.—The erection of the new Government dam in the river near Charleston, has hidden from sight the famous "pictured rock," one of the familiar landmarks of the Kanawha Valley, and one which has occasioned much wonder and fruitless speculation. The rock was located near the mouth of Paint Creek, and, while the river was in its natural condition, was visible at low water every summer. Some years ago a part of the stone was removed for building purposes, an act of vandalism which should have been prevented at all hazards, and now the remainder is submerged at all seasons of the year. When whole, the surface of the "pictured rock" was about 20 by 30 feet in extent, and was covered with representations of animals, fish, and fowls, carved deep in the smooth surface. On one side were the figures of a man and a bear, the latter being about life-size. Near by was a buffalo track, and a short distance away was the representation of a large fish and a number of footprints, evidently representing the imprint of a child's feet. The work was evidently done by prehistoric people, as the traditions of the valley are that the representations were on the stones when the first white men visited the region, and that they then bore unmistakable signs of great age, being water-worn and smooth. The vicinity of Paint Creek is rich in aboriginal and prehistoric relics, and a volume might be written on the discoveries which have been made there. Almost every excavation brings to light something of interest to the antiquarian, and there is every evidence that in past ages the valley was thickly peopled by an unknown race, probably contemporary with the mound builders of the Ohio valley. At Moorefield, from the time of the first settlement, the cliff known as the Gap Rocks, in the Petersburgh Gap, has borne the gigantic representation of a common fox. The picture is upon the sheer and inaccessible face of the rock, some 30 feet from the top and nearly 100 from the bottom, and being colored a dingy yellow, in sharp contrast to the brown stone, has been visible for a long distance. Recently, Glen McGill of Ohio, who was visiting Cell Beans, near this place, went out to view the fox, accompanied by Mr. Beans. After an inspection from the bottom of the cliff the two men ascended to the top, and making a rope fast to a tree, McGill lowered himself down to the fox. He describes it as being about twelve feet long, and painted or plastered upon the cliff with a substance resembling earthenware glaze, which is as hard as the rock itself. The surface of the fox is quite rough, as though the stuff was roughly smeared on by hand before it hardened. There was a high wind blowing at the time McGill made his venture, and he ran considerable risk. He took along a mallet and chisel intending to cut his name on the fox, but was prevented by the force of the wind, which swung him about at an alarming rate.—*New York Sun.*

The Dry-Dock at Newport News, Va.—The largest dry-dock in the United States, built by the Chesapeake Dry-Dock and Construction Company, was opened at Newport News, Va., recently. In connection with the ceremony of opening, the United States monitor "*Puritan*" was taken into the new dock. A large party was present, including Governor Lee and many naval officers. As the party arrived the dock was flooded, and preparations were made for taking the immense iron-clad "*Puritan*" into the dock. Lieutenant Tyler of the "*Mayflower*" was in command, assisted by Constructors Bowles and Linnard, and the "*Puritan*" was hauled in and placed in position. The gates were closed, and the powerful pumps put to work to clear the dock of water, which was done in about two hours. The "*Puritan*" is 300 feet long and 60 feet wide, but, to see her in the dock, she looked almost like a tug-boat. The dock is 630 feet long from head to outer sill, 130 feet wide at the top and 50 feet at the bottom, and 33 feet deep, with a slope in the bottom of 24 inches to the 500 feet. The approach to the dock is piling, 250 feet long and 150 feet wide, while on each side piers 80 feet wide afford ample wharf-room. The caisson is an iron structure, 90 feet long on top, 50 at bottom, and 33 feet deep. The dock is supplied with two centrifugal pumps of a capacity of 40,000 gallons a minute, each of which empties it in 1 hour and 30 minutes. The combined power of the two engines is 500 horse-power. The new dock will accommodate any ship now afloat. The peculiar construction of this dock meets with the hearty approval of sea-captains, as it does not strain their ships in the least.—*Springfield Republican.*

TRADE SURVEYS.

In all the voluminous statistics published relative to railway earnings, banking operations, mercantile transactions and manufacturing activity, one underlying tendency is observable, viz., the lessening of cost and the improvement and expansion of facilities. Capital is earning less in all organized channels, and hence the outflow into new fields and avenues where the rewards are, or promise to be, greater. The narrowing margins instead of checking investments is increasing them, in order that greater capital and greater centralization of effort and management may lessen cost per unit of product, or service or advantage conferred. There are two marked tendencies in business seemingly contradictory, but in reality working towards one result, viz., the centralization of enterprise on one hand, and the springing-up of a multitude of little enterprises on the other. The construction of railroads has necessitated this on one hand, and made possible individual enterprise on the other. Very good, cheap land is rapidly disappearing, and speculative holdings are increasing at an alarming rate. Eventually, there will be a pressure from agricultural employments to mechanical when land rises in value beyond a certain price, and competition will then depress the value of mechanical labor. The virtue and strength of our particular form of Government will then become evident, or its inherent weakness will be then manifest. But, meanwhile, social and economic problems are in process of solution, which will prevent or control the appreciation of land on one side and the decline of wages on the other hand. The present tendency is the reverse of this, viz., capital's share is declining and labor's share is increasing, and this tendency will continue until a forced settlement of accounts will be made between debtors and creditors and lenders and borrowers. Questions like these and others of a more or less abstract character are discussed by practical men much more than editors imagine, and very comprehensive and logical views are expressed. The common and business sense of business men recognizes the fact that great changes are taking place, and that new conditions and capabilities are developing out of our rapid and extraordinary growth. The events of the week indicate an enlargement of business in railroads, banks, manufactures and among those engaged in the distribution of merchandise. Yet, the unfavorable influences which have been hanging around the market for months have not disappeared, and probably will not for some weeks to come. The iron and steel makers are still waiting for summer business. Rail-makers book very little new business. Southern iron-makers are busy and new furnaces are going up. The talk in trade circles still is, that an enormous amount of work will be entered upon by early summer. Crop conditions are favorable; agricultural interests are prosperous. The granger have the railroads by the throat, at last, instead of by the tail, as they had a decade ago. Railroad conditions have not improved; earnings decline; rigid economical management is being resorted to. There is urgent need of the development of ability in that direction; managers feel deeply concerned at the railroading prospects, and cannot see their way out unless they can in some way charge more for a short haul than a long one, per mile. The Inter-state Commerce Commission is loaded up with six months' business of a character which cannot be cast aside. Numerous adjustments are imperatively demanded at the hands of such an impartial tribunal. A great deal depends upon the settlement of the railroad problem; the investment of very many millions of dollars will be determined by it. Financial authorities await the outcome with more than ordinary interest.

If it can be demonstrated that National and State railroad boards can do justice to shipping interests and manufacturing interests, and yet do no injustice to stockholders and railway interests generally, then the railroad, investing and business interests will square themselves to and with that result, and fresh railroad construction will be plunged into, and the beneficial influences on all other industries cannot be measured. At present producers are keeping a tight grip upon production, and jobbers are refusing to carry more than a safe volume of goods. Manufacturers are working from ten to forty per cent below their capacity. The iron-workers West threaten to cease work for two months during the year. The glass-workers have not worked during the summer months at any time. The anthracite-coal producers are working one-half capacity, and barge companies are preparing to haul coal in barges along the coast, instead of by schooners, as heretofore. Extensive preparations are being made in Pennsylvania to utilize the Poughkeepsie Bridge by coal-miners, lumber and iron manufacturers. The textile manufacturers are not adding much to their output. Much satisfaction is expressed by domestic woolen manufacturers over the prospects of an advance of duties on woolens to a practically prohibitive limit. Hardware manufacturers, except in specialties, are blocking up. Nail-makers East are selling nails almost at cost; in the West better prices rule. There is an active demand for sheet-iron pipe iron, barbed-wire and merchant-steel. Wood-working machinery interests are not crowded, but implement and tool makers are fairly busy. Locomotive-makers are working twenty-five per cent below capacity, and car-builders thirty-three per cent, approximately. Better conditions are looked for in July. An early fall trade is expected by jobbers and manufacturers. Adjustments are progressing among Western coal operators and miners. Architects report pretty full building activity. Architectural ability is in demand, especially in Western cities and towns, but it is obliged to exceed the prescribed professional limits frequently and be useful all around. Building material is kept in good supply. Lumber, excepting poplar, is plenty. The lumber manufacturers have succeeded very well in maintaining organizations that repress undue competition. Supplies East are large, but under control. A great deal of saw-mill machinery is still going up. In fact, the expansion of manufacturing capacity is enormous, and to some people it is alarming. If it were possible to convene a congress of business men to decide upon how much manufacturing to do, no resolution could pass authorizing as much as is now in hand and projected. Among the agricultural interests, the mortgage indebtedness is being paid off according to agreement. In manufacturing channels the volume of borrowed money is increasing very rapidly, but the amount hazarded in any one industry is not very large. There is nothing wrong on the commercial horizon. The copper syndicate had a meeting in Paris on Monday to liquidate, but poor headway was made. British fingers that were burned are seeking redress behind legal measures, and this does not add to the peace of mind of the speculators in their Waterloo defeat. Prices are drooping, and American exports are practically nothing. Deeper interest is being taken in schemes to foster exporting enterprise, but no very practical plan can be projected until after the coming conference of North and South American governments. Capitalists have been critically examining our ship-building facilities, it is thought with a view of possibly starting new ship-yards, should such enterprise be found advisable after Congress shall have had an opportunity of acting in the interests of a revival of the American export trade.

S. J. Parkhill & Co., Printers, Boston.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 698.

MAY 11, 1889.

Entered at the Post-Office at Boston as second-class matter.

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SOME of the rooms in the new Public Library in Boston are being covered with a sort of vaulting which, so far as we know, has been used in this country only in this building, and in some about New York. The vaulting is constructed with thin, flat tiles, about one inch thick, six inches wide and a foot long. These are laid in three or four courses, according to the span and the weight to be sustained, with Portland cement between. At the Library, the rooms already covered are about twelve or fourteen feet wide, and the vault is, in most cases, of a nondescript order, forming a portion of the surface of a ring of circular section. This shape is given to it for convenience in construction. A skew-back, or rather, a formeret, is made on one wall by means of three or four courses of tiles built-in in the form of a circular arc. Another skew-back, in the form of another circular arc, is then formed on the walls at right angles with the first. These skew-backs spring from the same point, in the corner of the room, as the first, but the radius of their curve need not be the same, and in the oblong rooms is generally longer, so as to make the rise the same, with a longer span. The mason then begins at the first skew-back, using a light centre, which he can carry in his hand, formed to the same radius as the skew-back from which he starts, and lays a row of tiles on the centre, the ends of which he supports on the side skew-backs. The edges of the tiles are jointed with plaster-of-Paris, which sets immediately, so that by the time the ring of tiles is finished, the centre can be taken out and moved along on the side skew-backs for setting another row of tiles. In this way a sort of dome is formed, of rings of tiles, all of the same radius, but rising from all sides to the centre. As the dome approaches the remaining side, a fourth skew-back is formed on that side to rest it on. As soon as the first shell is completed, it forms a platform capable of bearing the weight of the men, and the subsequent courses of tiles are laid by hand directly upon it, taking care to break the joints. All the subsequent work is laid in Portland cement, the plaster-of-Paris being used in the first course only to hasten the hardening so that it can be worked on. In the case of large rooms at the Library, where piers occur in the middle of the rooms, they are used to carry arches, also of three or four rows of tiles, on which the domes rest as on skewbacks. The appearance of the tile domes is very monumental, even without any plastering or decoration, but of course they can be finished as required. So far as strength is concerned, the new method of vaulting appears to surpass a construction of iron beams and terra-cotta arches, as usually put in. A heavy load has been put on one of the arches at the Library, and after the cement has had time for setting, the load is to be increased until the structure breaks down. Whether the thrust is greater than that of the brick or terra-cotta arches between iron beams seems to be uncertain. The Portland cement unites the tiles into a solid mass, like an eggshell, and it was found at the Boston Library that no deflection was caused by the heavy load placed upon it, showing pretty conclusively that it acted as a shell, and not as a proper dome. The cost of the new construction is about the same as that of iron beams and brick or terra-cotta arches over the same span, supposing that to be moderate. For many purposes the appearance would be better, although it takes much more height, counting the distance from the springing to the crown. The weak point, as it seemed to us, is in the cross arches, between the piers, on which two domes descend from opposite sides. The three or four rows of tiles which form these arches, if they constitute a real arch, give a very thin one, which an irregularity of loading might, one would think, easily distort beyond the limits of safety. If they do not form an arch, but a curved lintel, the thickness appears too small to sustain safely the strain which would be brought upon it by anything like a heavy load on the two vaults which it has to support. This, however, is a matter which can be determined better by tests than by theorizing, and it is to be hoped that the trials which the Trustees of the Boston Library propose to make will cover all these points, and that the results of them may be published for the benefit of the building public.

AN architect's suit was recently decided in the Supreme Court of Massachusetts, which has a certain interest. The architect of the Adams House, a well-known hotel in Boston, sued the owner for something over twenty-five thousand dollars, for services in preparing plans and superintending the construction of the building. The defendants claimed that the architect agreed to render the necessary services for three and one-half per cent on the cost of the building. This was four hundred and fourteen thousand dollars, so that his commission amounted to fourteen thousand dollars, of which they had paid him eight thousand dollars, and were ready to pay the balance. The architect admitted the agreement to accept three and one-half per cent commission, but claimed additional compensation for extra services and for superintendence. Evidence was brought as to the skill and reputation of the architect, and the auditor who first heard the case awarded him about eighty-five hundred dollars. The case was tried again before a jury, which brought in a verdict for thirteen thousand dollars for the architect. This, added to the eight thousand dollars previously paid on account, is about five per cent on the total cost of the building, so that the jury seems to have taken the view that five per cent on the cost is about what the architect ought to have for such work, and that if he was foolish enough not to come to a clear understanding in the first place with his clients, about what he was to do and what he was to be paid for doing it, he deserved to lose the comparatively small compensation which he might have earned by extra work.

THE city of Toronto is having a little experience with building contracts which is likely to be valuable to it hereafter. It seems, so far as we can gather from the Toronto *Globe*, that a firm of contractors agreed to furnish the city with paving-blocks of "first-growth cedar, free from pin-holes." They furnished the blocks, but some one happened to examine them and found that they were not "free from pin-holes," and the inspector on the work gave notice to the contractors that no more blocks not in strict accordance with the specification would be received. The contractors appealed from him to the Chairman of the Board of Public Works, saying that all first-growth cedar had pin-holes in it, and that it would be as reasonable to expect them to find trees without bark as timber of the kind specified without them. The chairman gave them no comfort, but announced his intention of supporting the inspector, and the contractors, after a little consideration, resolved to "throw up the contract," and, accordingly, took six hundred men and nearly two hundred teams away from the work, leaving them to idleness. If the contractors expect to coerce the city authorities by this expedient to accept materials of a different quality from those contracted for, we hope they will be disappointed. If the specifications called for materials which could not be furnished, the time to find it out and speak about it was before the contract was signed, and representations

of the kind should not now be listened to for a moment. Still less should the city allow itself to be threatened or bullied by men whom its officers are simply trying to compel to live up to their own promises. If the contract contains, as of course it ought, provision for having the work completed by other parties at the expense of the contractor in case the latter neglects his duty, and if the engineer in charge has been careful to guard the city's interest by keeping back a good reserve of payments, a good lesson can be easily and quickly taught those who wish to have dealings with the municipal authority. Of course, we do not advocate anything like oppression, but the high-handed practice which is so popular among contractors for public work of "throwing up" their contracts at the least provocation, and turning a lot of hungry voters into the streets to terrify the politicians, needs repression to be rebuked. If a contractor has in good faith undertaken to do what is impossible, his best and most natural course is not to try to terrify the other party to the contract into accepting something else in place of what he agreed to do, but to go to him, or the expert who has charge of his interests, and explain the situation frankly, asking for such relief as can be fairly granted. Very few architects or engineers would advise their clients to take advantage of an innocent mistake, or to insist upon impossibilities merely for the sake of distressing a person who had inadvertently entered into an embarrassing agreement; but no architect or engineer would fail to instruct his clients that in such a case they were entitled to insist upon the letter of the agreement, and that any concession they chose to make would be simply a favor on their part. However it may be with private individuals, municipalities are usually very willing to do justice in such cases, and to pay fairly for work and materials honestly and faithfully rendered, even though the contract provides only an inadequate price, and it would have been much better for the Toronto contractors to have appealed to the public sense of justice for subsequent reimbursement, if the fulfilment of their promises involved them in loss, than to have plunged at once into a struggle in which not only the law, but the general sense of what is courteous and fair, will be against them.

SO many architects carry accident-insurance policies, that the following case, which was decided in France the other day, has a certain interest. A man held an accident-policy, in which it was stipulated that accidents proceeding "from infractions of the laws and public regulations" should not be covered by the policy. The holder of the policy, being in a railway station, crossed the tracks to reach a train, although he was warned not to do so by the station-agent. While he was crossing a locomotive struck him, and he died from the effect of the blow. The accident-insurance company refused to pay the indemnity, on the ground that death was caused by infraction of the public regulations, and the widow sued to recover the money. The court decreed in her favor, on the ground that the warning of the station-agent was an official act as servant of the railway company only, and could not be extended to serve, in a contract of insurance, as the act of a public officer. Lest, however, any reader should be tempted to risk his life, as well as his insurance, by crossing tracks in front of trains in this country, it should be remembered that American accident-policies often provide expressly that the insurance shall not cover accidents arising from crossing railroad tracks or walking on them; and in some of our States, if we are not mistaken, the act of walking on a railroad track is itself made a misdemeanor, so that insurance could not, under the ordinary accident-policies, be collected for mishaps due to this violation of law.

THE Rotch Scholarship for the present year has been awarded to Mr. Henry Bacon, Jr., of Boston, one of the best-known draughtsmen of the city. As usual, the number of competitors was very small, only three or four having, we believe, applied for the preliminary examination. Fortunately for the reputation of Massachusetts architects, the quality of the candidates has been uniformly good, but it is astonishing that so great a prize, the realization of the dearest dream of most ambitious young architects, should not be pursued by them more eagerly. To say nothing of the pleasures of a two years' sojourn abroad to a young architect, the advantage to his future career, not only of the study in which he would occupy his time, but the reputation which the winner of so renowned a scholarship gains, is almost incalculable. We are so little accustomed to artificial distinctions among men that it hardly occurs to us that the winner of a great professional prize in this country, quite as much as in any other, has his future practically assured. If he is even moderately possessed of prudence and common-sense, employers and clients will come to him, in preference to others, simply because they have heard his name in connection with a professional distinction which could not have been gained without professional merit, and it will be his own fault if the connection so easily and happily formed is not indefinitely enlarged and perpetuated.

THE Massachusetts Charitable Mechanic Association seems to have seen an opportunity for taking the wind out of the sails of the younger body, the Association of Master Builders, by putting itself at the head of a movement for the establishment of trade schools in Boston. It is well known that Colonel Auchmuty has recently made an offer to the Master Builders' Association, or certain members of it, proposing to contribute a large sum every year for three years toward the support of such schools. Whether this association has made any answer to the offer we do not know, but the Charitable Mechanic Association, by appointing a committee to consider the subject of the establishment of such a school "either alone or in conjunction with other parties," appears to have an eye out for such help. However that may be, it has appointed a very good committee, and whether the Charitable Association or the Master Builders carry the matter through, it is sure to be well done.

THE Government of India offers a prize of one thousand rupees, about three hundred dollars, for the best text-book on "Hygiene and Domestic Economy," adapted to the use of senior and advanced pupils in the English and Anglo-Vernacular schools. The book should treat of the subjects mentioned in the Sanitary Primer called "*The Way to Health*," and should not comprise more than one hundred and fifty pages. Manuscripts must be sent to the Home Office, Simla, and must be received before the first of September next, and the successful one is to become the property of the Government.

THE City of Paris has opened a competition for the decoration of some of the remaining rooms in the new Hôtel de Ville. Only French artists are admitted to the competition. One of the rooms to be decorated is a reception-room in a certain corner, and the sum of eighteen thousand dollars has been appropriated to the work. The other room is the vaulted gallery known as the Galerie Lobau, and twenty-four thousand dollars is to be paid for its decoration. The subjects and treatment for the Galerie Lobau are left absolutely to the discretion of the artist, but the subject to be represented in the reception-room must be the siege of Paris.

IT seems that the pneumatic gun invented by Lieutenant Zalinski is becoming very popular as a destructive agent. Already the company formed to manufacture the guns has received orders from the Italian, Spanish and Egyptian Governments, but the greatest compliment of all has been received from the German Government, which is said to have constructed a gun of its own on Lieutenant Zalinski's model, twelve inches bore and seventy-four feet long, which it has been experimenting with at Kiel. A projectile of bronze, six feet long, and weighing about two hundred pounds, was used in the experiments, with a charge of explosive gelatine which may be carried up to six hundred pounds if desired, although not more than seventy-five pounds was employed in the trials at Kiel. With this charge a ship, anchored a mile and a quarter away, was completely destroyed with two shots. The first shell fired at the vessel struck the water a little distance from it and exploded under water, injuring the target seriously. The second struck it fairly in the middle, completely destroying it. From this account it would seem that either the practice of the German artillerymen must be very superior, or their new gun must have been made and bored very accurately and stiffened in some way. In the earlier Zalinski guns the spring of the long, light barrel interfered with the accuracy of the fire, and if a gun nearly one-fourth longer than these had been made to deliver its projectile with so much greater steadiness and accuracy, the improvement will be worth copying.

BUILDERS' HARDWARE.[1]—XXV.

DOOR-KNOBS.

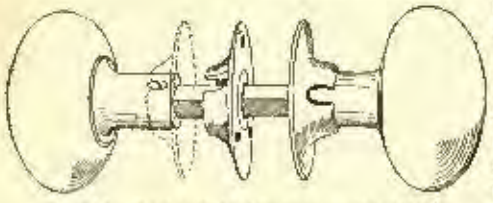


Fig. 366. Knob with Spindle-screw partly covered.

THE ordinary appliance for operating a door-latch consists of a knob on each side of the door, made of porcelain, wood, composition, or metal in various forms, but generally in the shape of a flattened sphere. The knobs are attached to metal shanks serving to hold them away from the door, and to prevent their pushing in, and the two knobs are connected through the lock by a square spindle. The spindle is firmly attached to the shank of one knob, and on the other side of the door it fits loosely in the shank, considerable length being allowed for the adjustment to various thicknesses of doors, the inner knob being finally secured in place by a screw on one side of the shank which passes entirely through the spindle, and sometimes is also made of sufficient length to turn into the opposite side of the shank. The hole in the door through which the spindle passes is covered by a metal disk technically designated as a rose. The rose is secured to the door by screws, and as the shank of the knobs is made to fit closely against the rose, if well put on there will be no strain on the lock when the knob is pulled from the opposite side, all strain being gathered on the rose itself. Knobs are usually provided with a number of small washers, so that the adjustment between the bearing-surfaces of the roses and the ends of the shanks can be made exact, and thus any rattling be obviated. In many instances the shanks are secured to the spindle with screws on each side of the door, so that the knob can be taken off from either side of the door. For front-door and vestibule work the outer knob should always be securely attached to the spindle, so that no screw is necessary, as otherwise, if the shank is held by a screw it can be removed from the outside of the door, the spindle pushed in and the inner latch follow turned back. For interior work, however, it makes little difference whether screws are used on one or both sides, though many consider the use of screws as altogether objectionable, owing to their liability to work loose; and, aside from any questions of design, the ingenuity of hardware manufacturers has been chiefly expended upon securing a better connection between the knob and the spindle. Still, few of the patented forms of attachment have been very generally received, and the old style of screw attachment seems to meet with the most favor, if we may judge by usage. It is not the question of cost alone which has decided this in the minds of many builders and architects, but rather a belief that a tangible fastening like a screw which is easily placed and easily removed, is, after all, more satisfactory than any concealed device.

The objections to the old style of fastening are, however, easily appreciated. One trouble is that the spindle will work and wear away so as to be loose in the follow, and rattle every time the knob is touched. This is particularly noticeable in very old work, in which the parts are sometimes so worn as to admit of as much as half an inch play at the end of the knob. In new work, the spindle, the follow and the roses can be fitted so that any rattling is impossible, though with the old styles of fastenings this is accomplished only by the best manufacturers.

With the old style, the screws are apt to work loose, as applied by ordinary mechanics. In cheap work they nearly always do so; still, if proper care is taken and the screws turned up with a drop of thick shellac in the threads there will be little trouble, and none that cannot easily be remedied with a screwdriver.

There are other objections of less moment, such as the fact that considerable time is occupied in fitting the washers necessary to a proper adjustment of the spindle and shank; and the proper attachment of the screws takes time also. It is further found that when the spindle and shank wear away there is apt to be a strain brought upon the lock-plate through the door, thereby endangering the proper action of the levers. We have said, however, that these objections are by no means vital, and are such as might be due to careless or indifferent workmanship. One of the best evidences that the old style is the most satisfactory, is that every manufacturer has it on his catalogue-list. Anything else is really an exception, and we know of only one instance in which a manufacturer has undertaken to push exclusively a single form of knob attachment differing from the common style. It must not be thought, however, that no clever or good devices have been thought out. It is hard to simplify simplicity, and the screw connection, all things considered, gives eminent satisfaction.

The first variation from the old style has been to enlarge the rose, extending it out over the shank so as to partially or completely cover the screw-hole, a slot being left at each side through which the screw can be applied, the rose subsequently being turned and secured against the door so as to completely cover the screw. Figure 366 shows such a form. This device renders it absolutely impossible for the screw to become detached, though it does not prevent it from being a little loose, and so permitting the knob to rattle; and as the difficulties of getting at the screw are increased by this method, the probabilities are that most people would let the knob rattle instead of taking the trouble to tighten the screw. Still, this is an improvement, and when well applied is very satisfactory. The next step has been to cover the screw entirely. Figure 367 shows one mode in which this has been accomplished. The rose is made in two portions, one consisting of a flat piece resting against the door, and serving as a bearing-plate for the shank, while the other portion of the rose which would show in the finished work consists of a thin shell curved out so as to entirely cover the screw. The screws which hold the rose to the door pass through both the outer shell and the inner plate.

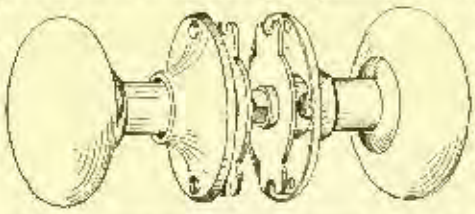


Fig. 367. Knob and Spindle-screws covered. Russell & Erwin Mfg. Co.

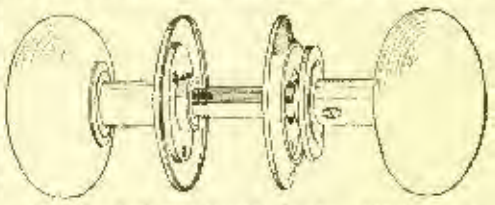


Fig. 368. Knob with threaded Spindle. Standard Lock Mfg. Co.

Figure 368 shows another form in which one screw is done away with. The spindle is cut with screw-threads. The rose is made in two portions, one being screwed to the door, and the other acting as a binding-screw or washer, screwing onto the threads of the spindle at the same time that the shank of the knob screws behind it, the two locking, and preventing the knob from being unturned except by forcible means. As the spindle is held in the latch, the knob can, of course, be turned but half way in either direction.

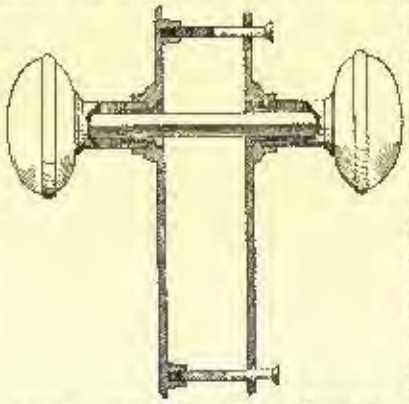


Fig. 369. Screwless Door-knob and Escutcheon combined. P. & F. Corbin.

Another form of knob substitutes a continuous ratchet on one face of the spindle for the screw-holes of the common form. These knobs are made by the Boston Knob Company, and outwardly appear like an ordinary knob. The advantage is that the knob can be adjusted at any point without the aid of washer, the screw catching onto the ratchet in any position of the shank.

Figure 369 shows a form which does away with the screws entirely. The key escutcheon and the rose are combined in a single plate on each side of the door. Inside of the rose is a hub which is cut with a screw-thread. The spindle passes through this and into the shank of the knob, which is cut with a thread corresponding with the thread on the hub. In applying this fixture the knobs are simply screwed on until

[1] Continued from No. 600, page 187.

they bear slightly on the edges of the rose. The escutcheon-plates are then screwed together through the door as shown on the drawing. As the spindle passes through the latch it will readily be seen that the knob cannot be unscrewed except by removing the escutcheon-plates, and as these plates bear on each side of the door above and below the lock, it is almost impossible to bring any strain on the lock-plate itself.

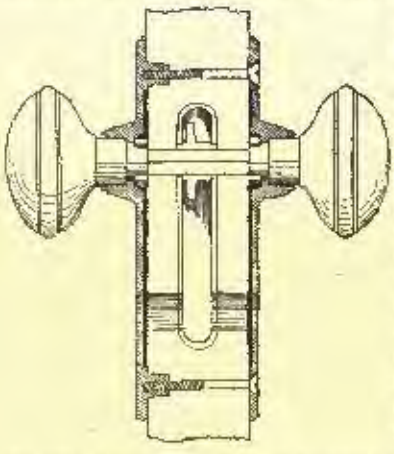


Fig. 370. Screwless Door-knob and Escutcheon combined. Russell & Erwin.

Figure 370 is a somewhat similar form as regards the escutcheon-plates. The knob, however, is attached by means of lugs on the shank, which in one position of the knob will slip into the hole in the rose; but when half turned will catch on the inner side of the plate, thus rendering it impossible for the knob to be removed except by unscrewing the face-plates from the door. Figure 371 is a device practically the same as that shown by Figure 368. Figure 372 is still another variety

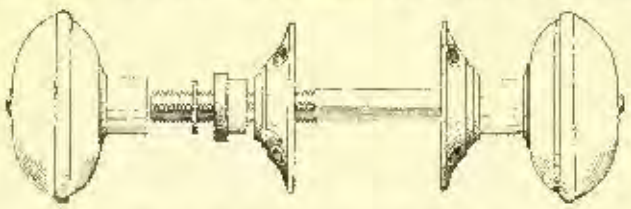


Fig. 371. Mathes's Adjustable Screwless Door-knob. Nowick & Britten.

of the same general style of attachment, using a steel binding-screw to hold the knob-shank in position.

The Yale & Towne Manufacturing Company has recently put on the market a form of screwless knob-shank shown by Figure 373. In this case the spindle is turned round at each end and threaded. The knob is provided with a swivel-nut, *D*, which fits the thread of the spindle. In applying, the nut is turned up until it bears slightly against the face of the

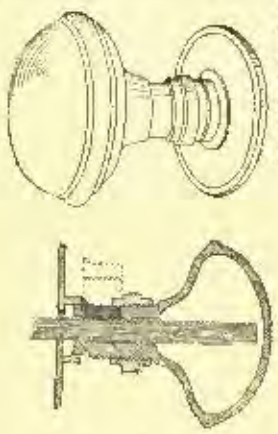


Fig. 372. Morris Patent Door-knob. Ireland Mfg. Co.

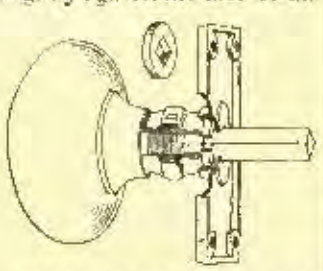


Fig. 373. Screwless Knob-shank. Yale & Towne Mfg. Co.

rose, and is then left in that position, a washer being interposed between the rose and the nut. The nut takes the place of the ordinary shank, and as this portion of the knob is seldom touched, there is little liability of the nut working loose, especially as it can be turned up pretty tight, and is made so as not to work too easily.

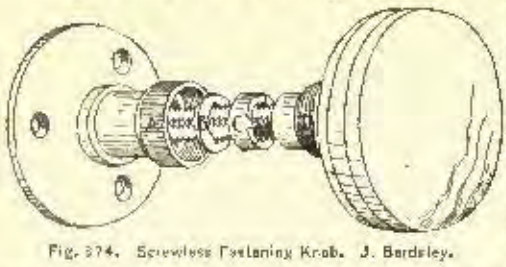


Fig. 374. Screwless Fastening Knob. J. Bardsley.

Figure 374 represents still another variety of screwless knob-fastening. The nut, *C*, forces the washer, *B*, against a shoulder inside of the shank, *A*, binding the latter firmly to the rose and to the door. The knob is then slipped over the spindle, and the shank, *A*, screwed over the shank, *D*, until the knob is drawn up tightly. The only chance of the fastening working loose is by accidental turning of the shank, *A*, which is not likely to occur.

The Yale & Towne Manufacturing Company has a device illustrated by Figure 375 which is on a very different principle from any of the foregoing, as it does not depend upon screws of any kind. In this case the knob-shank is cut out with an eccentric socket or bore. The ends of the spindle are turned down to exactly the same contour as the bore of the shank; so that while the knobs on either side of the door can easily be slipped over the ends of the spindle, they can be fastened by simply rotating them in opposite directions, when the fine pitch of grade of the eccentrics causes a great pressure to be exerted, which results in binding the knobs rigidly to the spindle. This is the simplest form of knob attachment in the market, and if properly applied, will always remain in order, though great care must be taken that the knobs are turned up firmly.

For front-door locks and latches it is necessary to have some form of spindle in which the two extremities may be worked independently, so that the outer knob may be locked while the inner one is free to rotate. The commonest form is to connect the two halves of the spindle by a swivel joint, Figure 376. Corbin has in the market a spindle in which the two halves screw together, thus permitting of very careful adjustment to the thickness of the door. The pitch of the screw-threads is so slight that the quarter turn necessary to open the latch does not throw out the knob from the door.

Fig. 375. Screwless Spindle and Socket. Yale & Towne Mfg. Co.

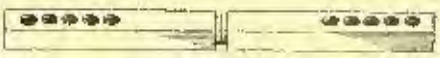


Fig. 376. Swivel Spindle.

There are various methods of attaching the head of the knob itself to the shank. When porcelain or mineral composition is used, the shank is leaded into the knob. Hemacite, zylonite, etc., are cemented or screwed to the shank, as are the cheaper forms of wooden knobs. Metal knobs are blind riveted, cast solid to the shank, or shrunk on. Glass knobs are commonly leaded, but in some cheaper forms are cemented or even puttied.

There are, however, some devices which are intended to attach the knob more firmly to the shank. Figure 377 is one which is used in connection with wooden knobs. The shank is cut with a screw-thread which turns into a corresponding

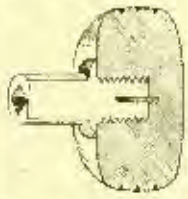


Fig. 377. Knob Fastener. J. Bardsley.

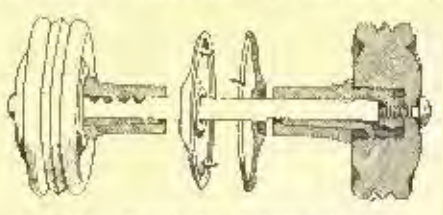


Fig. 378. Phipps's Patent Door-knob. Milford Door-knob Co.

thread cut into the knob. Before the shank is screwed in, a metal key extending through the shank is placed in the slot, and after the knob is firmly screwed on the key is forced into the wood by means of a punch placed in the opening of the shank, the key thus effectually locking the shank into the knob.

Figure 378 shows a form of attachment for either wood or metal. In this case the knob is held by a screw passing from the knob through the upper portion of the shank and into the head of the spindle. The spindle can be adjusted for any thickness of door by means of a small wedge which can be driven in before the knob is attached, in such a manner as to hold the shank at any given position.

[To be continued.]

Long Span of a Silicon-Bronze Wire.—A wire belonging to an English telephone company, which crosses the entrance to Dartmouth Harbor, has the remarkable span of nearly half a mile, *viz.*, 800 yards. On leaving the Dartmouth side the wire is 332 feet above high-water mark. It drops to 198 feet near the Kingswear side, and then rises again to 207 feet. The wire is very fine and light, being of No. 17 silicon-bronze, weighing twenty-four pounds to the span.—*Exchange.*

ARCHITECTURAL SHADES AND SHADOWS.[1]—IV.

CHAPTER IV.—LINES AND PLANE FIGURES.

Principal planes, lines and diagonals, and their projections and traces; shadows of points on either plane of projection; shadows of lines and figures parallel to a plane of projection and of principal lines in general.

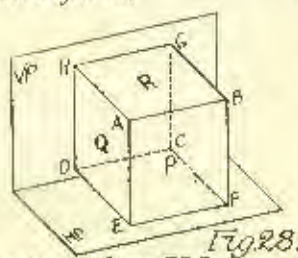


Fig 28.

Three Principal Planes, P, Q, R, determined by any three intersecting Principal Lines, a, AB, AI, AE. Such lines are themselves intersections of Principal Planes.

35. If we suppose a cube or rectangular prism to stand with its faces respectively parallel and perpendicular to the planes of projection, its six faces and six edges will form what are called *principal* planes and lines. Such planes are parallel to VP and perpendicular to HP; parallel to HP, and, consequently, perpendicular to VP; or perpendicular to both planes of projection and to GL. Principal lines are, similarly, vertical lines, horizontal lines normal to VP, and horizontal lines parallel to both planes of projection and to GL. They are illustrated by Figures 28 and 29. Principal lines are formed by the intersections of principal planes, and any two such lines intersecting determine a principal plane.

36. Lines parallel to the diagonals of the faces of a cube placed as above may be classed as *principal diagonals*. They lie in principal planes at an angle of 45° to one or the other plane of projection (as AF, BE, AG, HB, Figure 30) or to both planes (AD, HE). Their projections are shown in Figure 30, and they will be generally designated by the lettering used there and in Figure 30. A third set of lines should be noticed, parallel to the diagonals of the same cube; inclined, that is, at 35° 15′ to the planes of projection, and represented in projection by lines in all cases at 45° to GL, as shown in Figure 32. The planes passing through opposite edges of the cube and bisecting it may be called *principal diagonal planes*, each containing two cube-diagonals, and having for one trace a line at 45° to GL, and for the other a line normal to GL, or else having both traces parallel to GL (Figure 33). The shadows of these various lines and of figures in these planes, being those most common in architectural drawing, should be thoroughly mastered, and to these our investigations will now be directed.

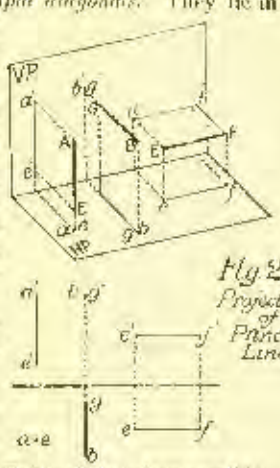


Fig 29.

Projections of Principal Lines.

The letters indicate lines parallel to those in Figure 28 similarly lettered.

37. As a large proportion of the shadows in architectural drawings fall upon vertical or horizontal planes parallel to HP and VP, and the picture-plane or plane of projection may be assumed so as to coincide with such a plane (the trace of the latter forming the ground-line), it will simplify matters to consider the shadows in the following rules as falling upon the plane of projection itself, thus avoiding the constant repetition of the words, "or upon a plane parallel to the plane of projection."

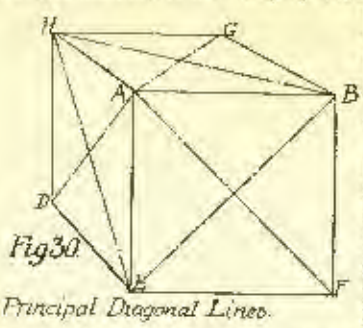


Fig 30.

Principal Diagonal Lines.

38. If a point O be given by its projections, o, o' (Figure 34), its shadow on VP (for example) is found by drawing both projections of a ray passing through the point. The horizontal projection of this ray intersects GL at o_1, which is the horizontal projection of the required shadow, whose vertical projection will, consequently, be at o'_1 on the vertical projection of the ray. In the same way its shadow on HP may be found, remembering that it may fall behind VP (*i. e.*, above GL) quite as often as in front of it, in which case care must be taken not to confound it with projections on VP. o'_2 is the vertical and o_2 the horizontal projection of the shadow of $o\,o'$ on HP in Figure 34.

Hence this rule:

(I) The projection of the shadow of a point O, cast upon a plane of projection, is found upon a line drawn at 45° to GL through the projection of O. Its distance from the latter, measured horizontally or vertically, equals that of O from the plane of incidence.

Hereafter, for the sake of avoiding tedious repetition, points, lines and shadows will be distinguished from their projections by prefixing the word "real" or "actual," omitting the words "projections of" wherever it can be done without obscuring the sense.

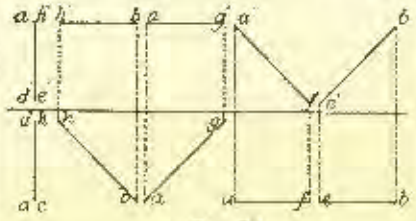


Fig 31.

Projections of Principal Diagonal Lines. The letters correspond to those of Fig 28 and 30.

39. The shadow of any right line is determined by the shadows of its extreme points (a, Figure 35). When only the direction of its shadow is required, the shadows of any two of its points will suffice (b).

40. It is easily seen from the rule in 38 that the shadow upon a plane of projection cast by a right line parallel to it must be equal and parallel to the line, since all the points of the latter are equidistant from the plane. Hence the shadow of a single point of such a line suffices to determine its shadow, as in Figure 36, where the shadow of the line is drawn through that of its point, $a\,a'$, parallel to the line itself, and its two segments, a', c', and a', b', laid off equal to $a'\,c'$, $a'\,b'$.

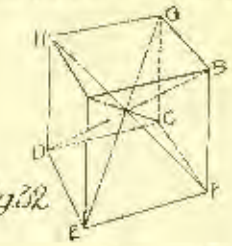
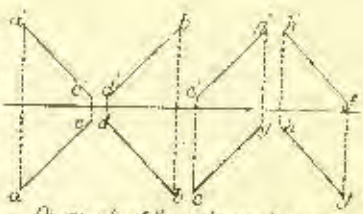


Fig 32.

This is equally true of plane figures parallel to the plane of projection, since they may be considered as made up of infinitesimal straight lines (Figure 37). The shadow of one point of such a figure suffices to determine the shadow of the figure.



Diagonals of the cube and their projections.

41. And finally, since any plane figure and its shadow on any plane parallel to itself are really parallel sections of its shadow in space, these sections are equal. Whence this general rule:

(II) When a plane figure casts its shadow on any plane parallel to itself, this shadow is both equal and parallel to the figure, and its projections are equal and parallel to the projections of the figure.

42. Applications of Rules (I) and (II) may be found in Plate II. In No. 8, for example, the difference between a' and its shadow a'_2, measured horizontally, is $a'a'$, and vertically $a'a'_1$, each of which is equal to the distance of the point $a\,a'$ from the plane of incidence. In the same way, the horizontal and vertical distances of b' from b'_1 are each equal to that of the edge of the coping from the face of the projecting pilaster. In No. 11 the shadows of a', b' and c' are found by laying off horizontally and vertically the distances of a', b' and c' from the plane of incidence, which distances can in many cases be ascertained without drawing a plan. So, also, the shadows of the horizontal and of the raking cornice are found by means of the shadow of a single point in each, these shadows being parallel to the cornice in each case. In Nos. 2, 3, 4, 6 and 7 the shadows of the horizontal and vertical edges parallel to VP are at once drawn parallel to those edges, and limited by the shadows of their extreme points. In No. 5 the vertical right-hand edge of the parapet casts vertical shadows on the risers of the stairs in elevation, their width in each case being equal to its distance from the riser; while in the plan its upper horizontal edge casts parallel horizontal shadows on the treads as wide as its own height above each tread. This is made clearer by the perspective sketch, Figure 38. From all these examples the corollary is evident that the *width of the shadow upon a vertical plane, of any horizontal or vertical member parallel to it, is equal to the overhang or projection of the line or edge casting the shadow.* This gives a simple rule applying to a multitude of cases: the jambs and lintels of doors and windows; the lower edges of window-sills, cornices

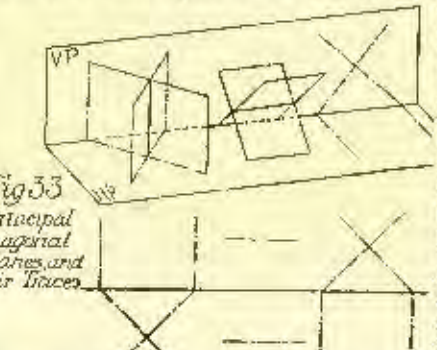


Fig 33.

Principal Diagonal Planes and their Traces.

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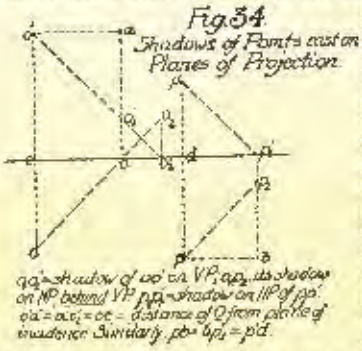
[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 176, No. 634.

NOTE.—[In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

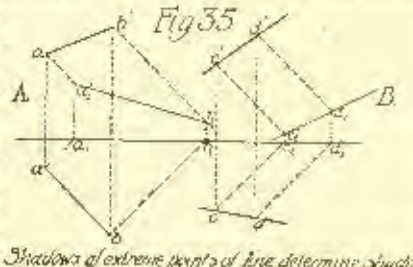
HP = horizontal plane of projection; VP = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow; small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multiplied by $\sqrt{2}$.

and string-courses; horizontal and vertical mouldings; the edges of piers, pilasters and projecting rectangular masses of building, and many others. Nos. 10 and 11 contain several examples of its application, while No. 9 illustrates the shadows of arches upon vertical planes drawn by means of the shadows of their centres (Figure 37). The plane of each stepping of the arch is supposed to be extended across the opening so as to receive the shadow of the centre of the arch next in front, as shown by the dotted lines in the plan. Having thereby found the vertical projections of the shadow of the centre, the shadow of the arch is then drawn from this new shadow-centre with a radius equal to that of the arch. Thus c'_1 is the shadow upon the plane of the main wall of the centre of the archivolt, whose radius is then used to describe its shadow from c'_1; c'_2, is the shadow-centre from which the shadow of the first arch upon the plane of a second is drawn, and so on.



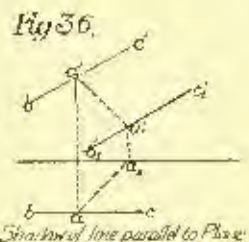
qq'=shadow of cc' on VP, qq₁ its shadow on HP behind VP. pp'=shadow on HP of pp'. p'a'=a'x'=cc'= distance of O from picture of windows. Similarly p'b'=b'y'=pb.

48. A line perpendicular to a plane of projection has for its shadow a line inclined at 45° to $G\,L$,[1] parallel to the projection of a ray of light. For the projection upon either plane of a line perpendicular to it is a point (note to Chapter II, 4), which we will call p'. Since p' is the projection on that plane of the whole line, it is the projection of every point in that line; consequently, a line drawn through p' at 45° to $G\,L$ must contain the shadow of every point in the given line (Rule I). But this will be true whatever the nature of the surface of incidence, so that the shadows of the various points of such a line, even when they fall upon an irregular surface, must still be in the line drawn through p' at 45° to $G\,L$. This is further evident if we consider that the invisible shadow of the line in question is a plane perpendicular to the plane of projection, and contains the cast shadow of the line (22, Maxim VII, *b*), which is, therefore, projected as a right line; for whatever the real form of the cast shadow, it lies in this plane of invisible shadow, and, as this plane is seen edgewise, every line in it will appear straight, although in perspective its irregular form becomes evident, as appears by comparing Figure 38 with No. 5, Plate II, and Figure 39 (note to Chapter II, 6, and Figure 37).

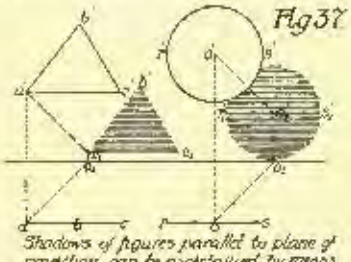


Shadows of extreme points of line determine shadow of the line. Shadows of any two of its points determine shadow of portion of its own shadow.

The *length of the shadow* of such a line falling on the plane of projection or upon a plane parallel to it is equal to the *diagonal of the line itself*. This is easily deduced from 38 and from inspection of the geometrical relations of the shadow itself. The various facts we have considered may be stated thus in the form of a rule:



Shadow of line parallel to Plane of Projection determined by the shadow of a single point.



Shadows of figures parallel to plane of projection can be ascertained by means of the shadow of any one point of the figure, as of aa in triangle abc, abc; or of center oo' in circle rss, r's's'.

44. (III). *The shadow of a line perpendicular to a plane of projection is a right line at 45° to the horizon, regardless of the form of the surface upon which it falls. Upon a plane parallel to the plane of projection its length is equal to the diagonal of the line casting it.*

This rule has very frequent applications in architectural drawing, some of which are shown in Plate II. In No. 1 the right-hand upper edge of the abacus casts its shadow on the wall, while that of the lower left-hand edge falls across the echinus, fillet and necking (crossing several other shades and shadows); both are alike lines at 45° to $G\,L$. In No. 10, the shadow of the horizontal flagstaff seen as a mere point over the window in the wing, and the shadow of the right-hand cornice of that wing running back to the main body of the building, are both drawn at 45° to $G\,L$, though they cross a variety of surfaces, mouldings, pilasters, windows, etc. In No. 5 the shadow of the upper right-hand edge of the parapet, which is normal to $V\,P$, falls across the wall, door, and upper riser; in the plan, its right-hand vertical corner casts a shadow across three treads of the steps; both, alike, are right lines at 45° to $G\,L$. It is evident that lines which cast oblique shadows in elevation, being horizontal lines, must in the plan cast shadows parallel to themselves; while vertical lines cast shadows at 45° to $G\,L$ in the plan, and vertical shadows in the elevation. Inspection of No. 5 and of Figure 38 will make this clear. The returning ends of stairs and window-sills; the invisible right and left edges of abaci of columns, of roofs, of porticos, and of projecting rectangular masses of building, are among the commonest examples of the application of this rule.

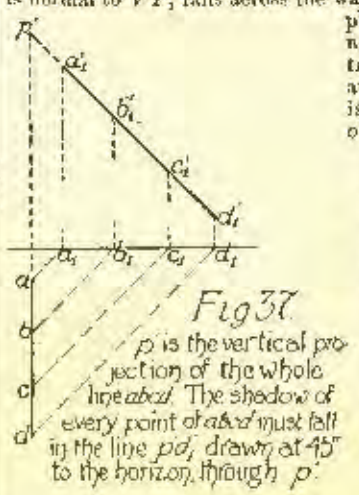


Fig 37.
p is the vertical projection of the whole line ab cd. The shadow of every point of ab cd must fall in the line pd, drawn at 45° to the horizon, through p.

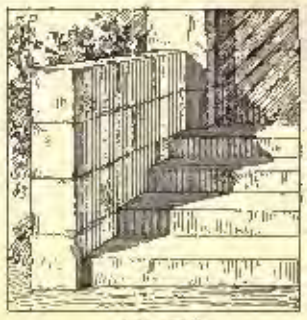


Fig 38.

45. Since all principal lines are either parallel or perpendicular to the plane of projection, Rules (II) and (III) suffice for obtaining the shadows of all plane and solid figures composed of principal lines, such as rectangles and squares, cubes and parallelopipeds, of every size and proportion. It is only necessary to cast the shadows of all the edges of such a solid; the extreme outline formed by these shadows bounds the shadow of the solid, and since by means of the shadows of squares and cubes the dimensions and direction of the shadows of their diagonals and of the sides of the inscribed octagons may be found; these two rules suffice for all the various classes of lines described at the beginning of this chapter, and the figures and solids composed of them, as may be seen in Nos. 2, 3 and 4 in Plate II, and in Nos. 6 and 7, which show their application to octagonal forms. But it will be advantageous to examine certain special cases more closely, and the following chapter will embody the application of these rules to the most important of them; namely, the square, "diamond" or lozenge, octagon, and their derivatives.

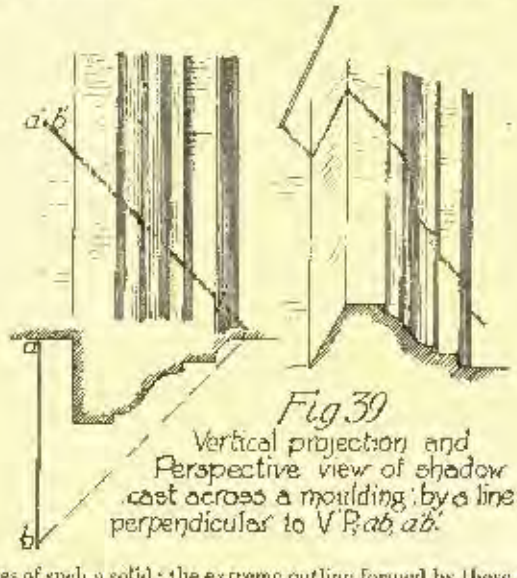


Fig 39.
Vertical projection and Perspective view of shadow cast across a moulding by a line perpendicular to V P. ab, a'b'.

(To be continued.)

[1] It is hardly necessary to constantly repeat the qualifying phrase, "parallel to the projection of a ray of light," which may hereafter be taken for granted with the words, "at 45° to $G\,L$," unless the contrary is specifically stated.

ILLUSTRATIONS.

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF MRS. JEREMIAH MILBANK, GREENWICH, CONN. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

THE building is about one hundred and eighty-five feet long and covered with Spanish tiles. The interior feature is the large hall with Connecticut stone fireplace and a window in staircase

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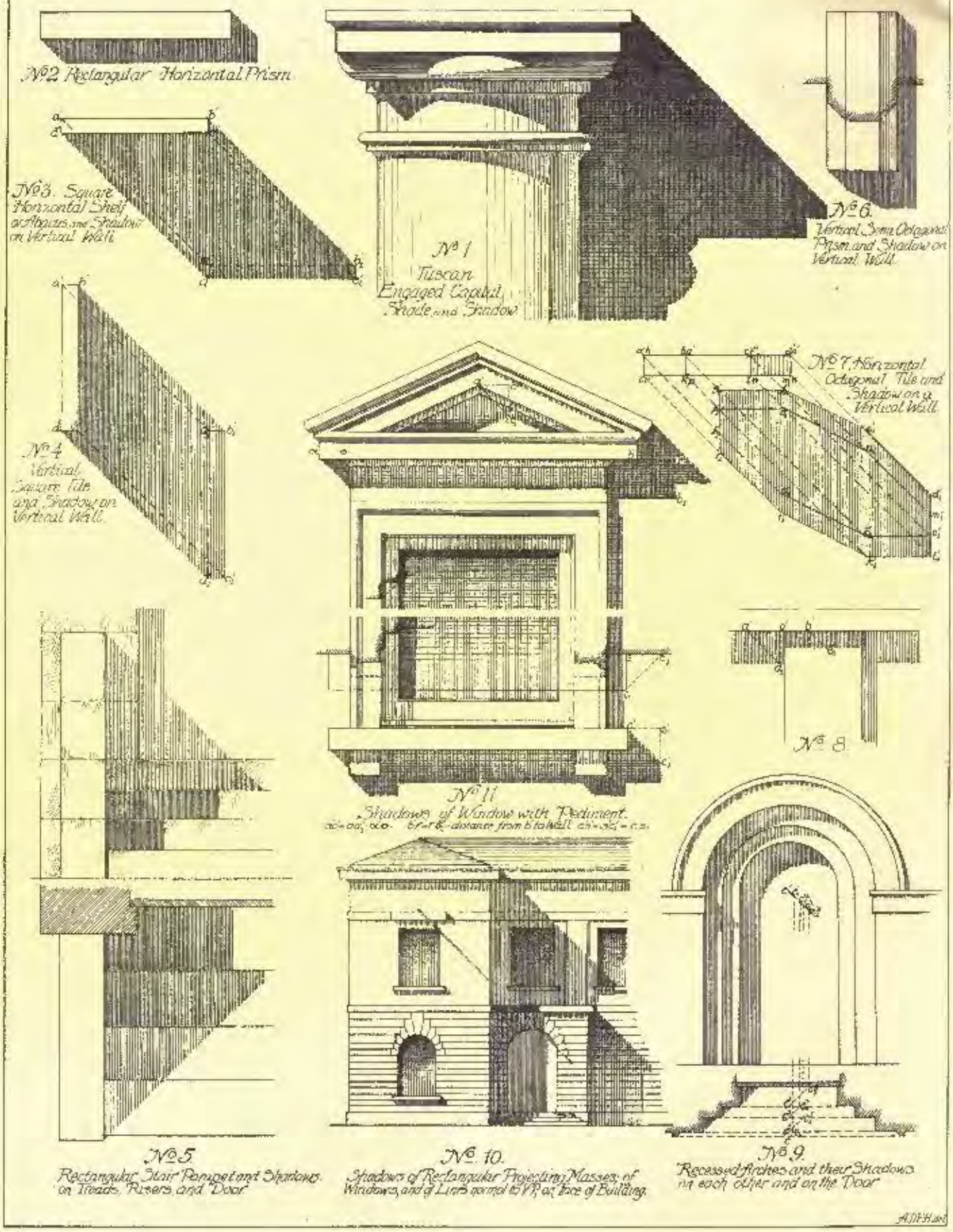
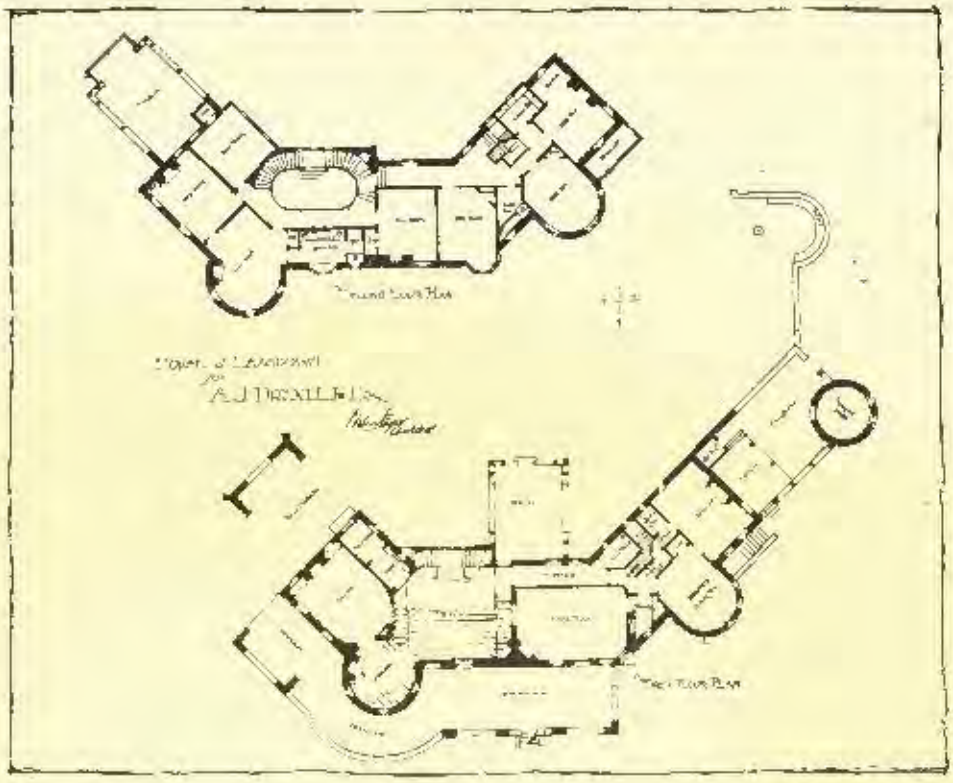
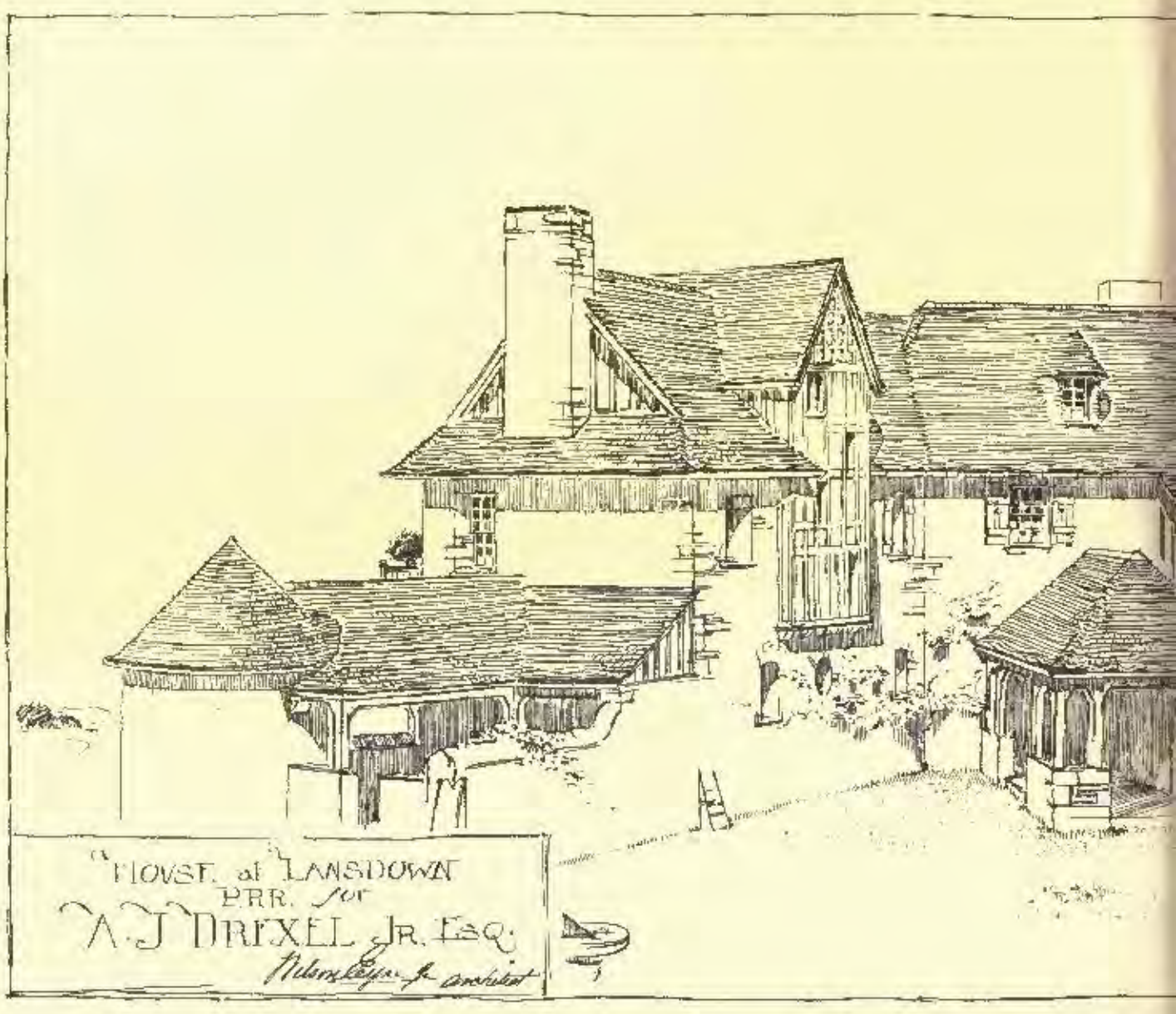
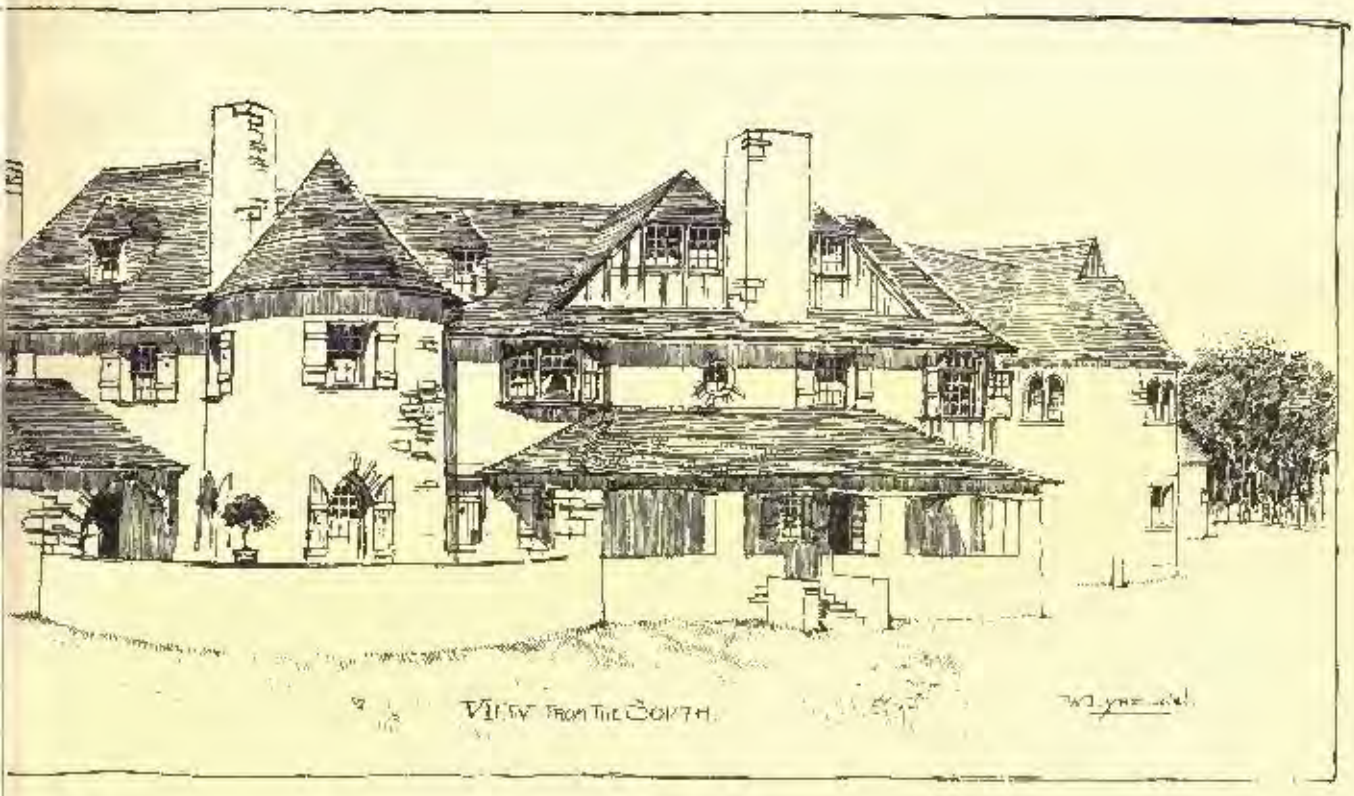
SHADES AND SHADOWS. PLATE 2.


№2 Rectangular Horizontal Prism.
№3. Square Horizontal Shelf with Recess and Shadow on Vertical Wall.
№1 Tuscan Engaged Capital, Shade and Shadow.
№6. Vertical Semi Octagonal Prism and Shadow on Vertical Wall.
№4 Vertical Square Pile and Shadow on Vertical Wall.
№7. Horizontal Octagonal Pile and Shadow on a Vertical Wall.
№8
№11 Shadows of Window with Pediment.
№5 Rectangular Stair Parapet and Shadows on Treads, Risers, and Door.
№10. Shadows of Rectangular Projecting Masses, of Windows, and of Lines normal to V.P. on Face of Building.
№9. Recessed Arches and their Shadows on each other and on the Door.




HOUSE at LANSDOWN
P.R.R. for
A. J. DREXEL JR. ESQ.



VIEW FROM THE SOUTH.

VIEW FROM THE NORTH.

Heliotype Printing Co. Boston.

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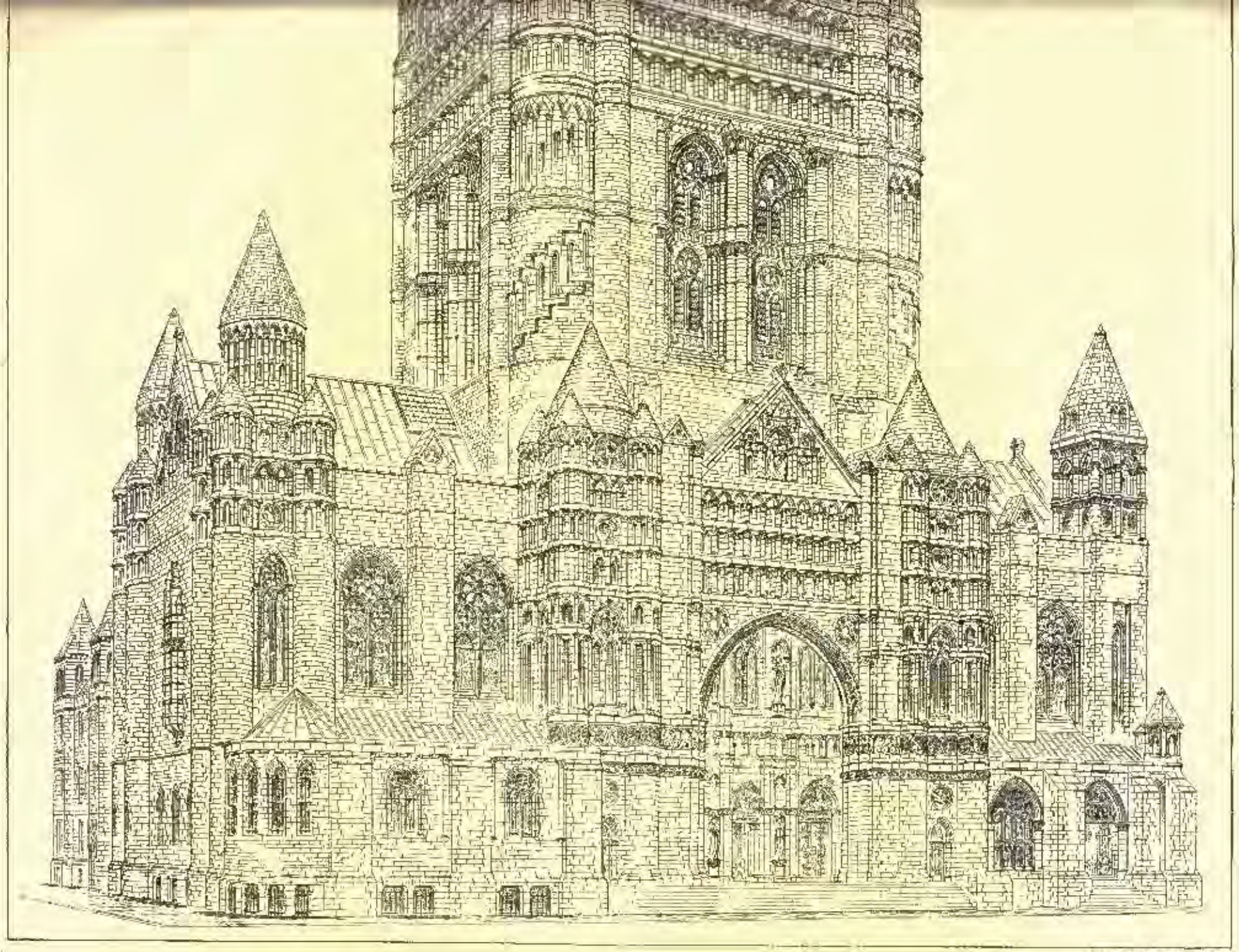
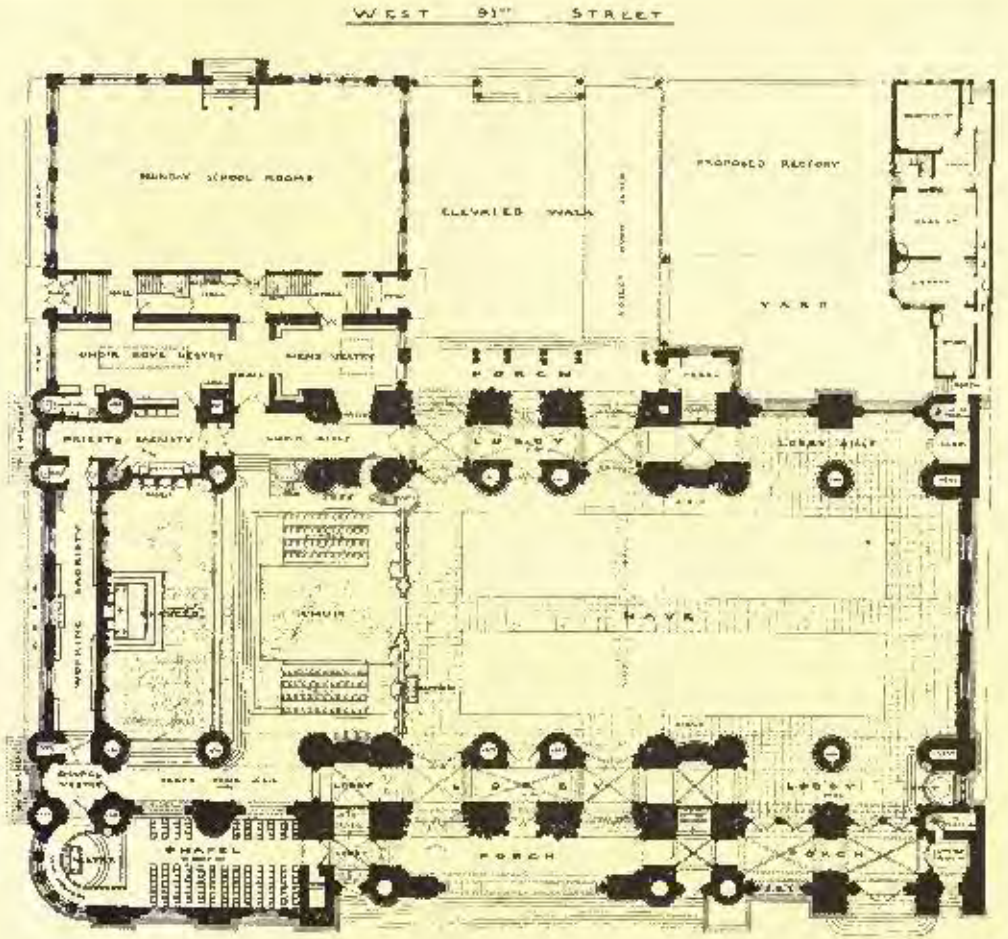
HOUSE OF MRS. JEREMIAH MILBANK, GREENWICH, CONN.

LAMB & RICH, architects.

HELIOTYPE PRINTING CO., BOSTON.

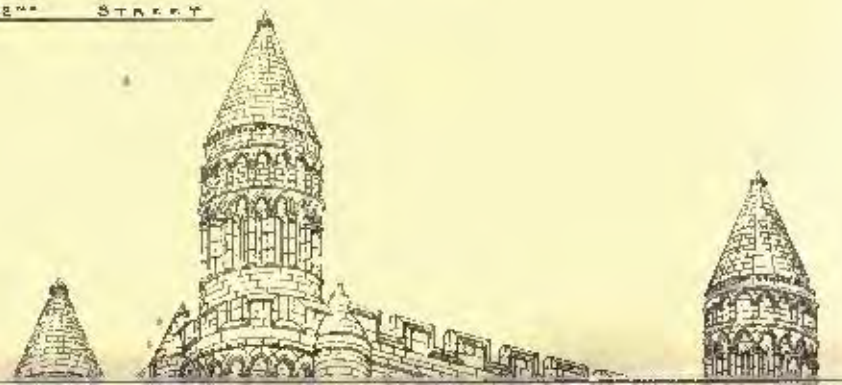


Heliotype Printing Co. Boston



ST SIMEON

COMPETITIVE DESIGN
FOR
CHURCH,
CLERGY-HOUSE AND SCHOOLS
FOR
TRINITY CORPORATION, NEW YORK, N.Y.
W. HALSEY WOOD, ARCH'T.



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10 x 19 in which, instead of colored glass, is a wrought-iron interior grill in the style of the Renaissance.

ARCHITECTURAL SHADES AND SHADOWS. — PLATE II.

See article elsewhere in this issue.

HOUSE FOR A. J. DREXEL, ESQ., LANSDOWN, PA. MR. WILSON EYRE, JR., ARCHITECT, PHILADELPHIA, PA.

HOUSE FOR J. DE F. JUNKIN, WEST PHILADELPHIA, PA. MR. A. W. DILKS, ARCHITECT, PHILADELPHIA, PA.

COMPETITIVE DESIGN FOR CHURCH, CLERGY-HOUSE AND SCHOOLS FOR TRINITY CORPORATION, NEW YORK, N. Y. MR. W. HALSEY WOOD, ARCHITECT, NEWARK, N. J.

AUGUSTE RODIN. — VII.

THE DOOR.

Group from the Door. Auguste Rodin, Sculptor.

NO one outside of the little circle of Rodin's intimate friends had the slightest idea of the importance of the commission that M. Turquet had given him. At the time of receiving it he explained the plan he proposed to follow in its design, and that official expressed his entire confidence in the sculptor's ability to carry out any scheme he might undertake. "I was sure," said M. Turquet on a subsequent occasion, "that I had discovered a great artist, one fully capable of executing any task confided to him. The result, as is now well-known, has amply confirmed my judgment."

Rodin's friends were equally confident, for, though he had not yet made any work composed of many figures, save a decoration or two on vases at Sèvres, they felt that his single statues of "The Age of Brass" and the "St. John" gave unmistakable evidence of a rich imagination and a wide resource of conception. The giving of such an order to Rodin, in view of the unfortunate circumstances which had surrounded him since his return to Paris, and the opposition to him, as expressed by the leading art influences of the city in refusing to justly recompense him at the *Salon*, was regarded by him and his friends as a bold and noble act on the part of M. Turquet. This feeling was expressed by Dargenty in *L'Art* of 1880, when he wrote: "It is to the honor of M. Turquet that he has dared to order of Rodin a monumental door."

A year after the commission was given, a journalist, whose name is not known, found his way to the sculptor's studio and reported that "one has a right to hope that the door will introduce a new and large style of sculpture, a style very much needed in these days of antique imitations and commonplace School inanities." For the next year or two an occasional journalist also caught a glimpse of the door, in spite of the desired seclusion of the sculptor, and wrote his surprise at its colossal proportions, with prognostications of its eventual success. In 1885, *L'Art* contained a number of illustrations of the first sketches on paper of the subjects on the door, thus giving the readers of that journal the first idea of the character of the sculptor's starting-point. The exhibitions at Petit's galleries, 1885–86, before alluded to, caused a general interest in the sculptor's work, and before the close of 1887 the most distinguished art lovers, *literateurs* and critics of Paris, as well as many from Belgium and England, had visited his studio and seen the door. As its general composition was defined, its principal groups and figures decided upon in sketches, parts of the work completed, and nearly all of the hundreds of subjects in process of execution, its immense scope of design, startling originality and copious art expression were enthusiastically recognized.

It was declared to be the most important piece of sculpture of the nineteenth century, and nothing since Michael Angelo could give any idea of its magnificence. No illustration of any sectional part of the door had been made until February, 1888, when *L'Art Français* published a glyptograph print of the central portion of the upper part. This view is included among the illustrations of *The American Architect*, together with many of the figures and groups belonging to the door not before published, and the principal statues and busts executed by him; in all a more complete exhibition of Rodin's works than has hitherto appeared.

The preceding pages have been written for the single purpose of giving the bare facts of Rodin's life as they occurred, with the circumstances that immediately surrounded him, in order that the reader may be free to form his own impressions and draw his own conclusions of the directness of the sculptor's nature, his loyalty to it, and the simplicity and force of his character; of his single-mindedness, his courage, his perseverance, his high idea of art, and his perfect belief in himself.

The writer first saw the door and its author in November, 1887. On entering the studio, a large, barn-like looking place, he saw an enormous structure in plaster, reaching nearly to the ceiling. This was the door upon which more than seven years of the sculptor's time, of hand and head, have been spent, and upon which, in the words of his friend, Octave Mirabeau, he may well pass the remainder of his life.

The first impression is one of astonishment and bewilderment: astonishment at the size of the door and the style of its design, and bewilderment at the extent and variety of the forms that compose it. If possible, this impression is heightened by a glance at the floor, for half of it, as well as every available place on the walls of the studio, is covered with plaster figures, in every conceivable position, that are destined to complete the work. It is like looking into another and strange world. And it is only after repeated visits that this impression is succeeded by the more gratifying one of wonder and admiration of the prevailing life of the figures and the fine sense of true sculpture that everywhere abounds. All idea of subject, illustration or purpose takes a second place in the mind, or is forgotten, in presence of the charm, the sensibility, the divine touch of art that takes possession of the beholder. He stands like one willingly enchanted in an atmosphere created by the wand of a magician. If he looks upward, three sinister left arms, from as many herculean forms, point straight at him, as though in condemnation of his intension; if he turn to the right, his eyes meet the beautiful figure of a young girl, whose whole being is a picture of despair; if to the left, a commanding statue of St. John the Baptist bids him to waiting silence; if he turn around, the piercing look of the life-like sketch of Bastien-Lepage greets him, and at his very feet lies the mutilated body of a colossal Ugolino. Turn where he will, tread where he may, these silent images follow him like a united shadow.

Although the door is generally understood and popularly called, for description's sake, an illustration of Dante's "*Inferno*," it is only true to a limited degree. Of its design and the thoughts and sentiments that have actuated the sculptor, he says: "I had no idea of interpreting Dante, though I was glad to accept the '*Inferno*' as a starting-point, because I wished to do something in small, nude figures. I had been accused of using casts from nature in the execution of my work, and I made 'The St. John' to refute this, but it only partially succeeded. To completely prove that I could model from life as well as other sculptors, I determined, simple as I was, to make the sculpture on the door of figures smaller than life. My sole idea is simply one of *color* and *effect*. There is no intention of classification or method of subject, no scheme of illustration or intended moral purpose. I followed my imagination, my own sense of arrangement, movement and composition. It has been from the beginning, and will be to the end, simply and solely a matter of personal pleasure. Dante is more profound and has more fire than I have been able to represent. He is a literary sculptor. He speaks in gestures as well as in words; is precise and comprehensive not only in sentiment and idea, but in the movement of the body. I have always admired Dante, and have read him a great deal, but it is very difficult for me to express in words just what I think of him, or have done on the door. I have only read one translation, that of Rivarol, the five-cent edition, and I have always carried it in my pocket. Other translations have been recommended to me as better than his, more learned, but I have never seen them. Rivarol's seems to be clear, charming, simple, and without pedantry. He may not have been the greatest of men or the most profound scholar, but I like his translation. It has always satisfied me.

"The salient subjects of the door are the two episodes of Paolo and Francesca di Rimini and Ugolino, but the composition includes the three phantoms and Dante. I never so much as thought of Beatrice, though I know it is a beautiful subject. Perhaps I may include it yet, but it will be difficult to treat, because I only make nude figures for the door, and I don't feel like representing her nude. I can't think of her as a nude figure, and for the door she could not be made otherwise. Besides, she is an angel, and I don't see angels as bodies, only as heads. Neither do I represent Virgil."

Though the sculptor modestly says that he has been unable to fully represent Dante, the writer believes it will be heartily conceded that whenever he has treated any of the latter's subjects it has been with all the fire and comprehension of the text, and has produced works of sculpture equal to anything that ever came from the poet's pen.

[All rights reserved.] Continued from page 200, No. 696.

What greater sense of speechless dole could be shown than by the three phantoms which surmount the door:

> "It is I that saw the fall of the rebel legions;
> It is I that saw the guilty races pass;
> It is through me that they go to everlasting sorrows.
> The hand that made the heavens laid my foundations:
> My birth was before men or days,
> And I shall remain longer than time,
> Enter, whoever you may be, and leave hope."
>
> *Riccard's Translation.*

Nothing less can be said than that this group is matchless as a conception. And its opposition of masses and power of concentrated purpose — daring in repetition — make it a work of sculpture

Various artists have treated this subject at the moment when the father is in the act of biting his fingers in the first scene of his agony, and when his sons are suffering the first pangs of hunger. Rodin goes at once to the depths of the whole tragedy. The youths have fallen to the ground, and Ugolino, seeing them so, and feeling the full terror of his situation, throws his own emaciated carcass down and crawls over the bodies of his offspring like a beast benumbed with rage and famine.

> "They expired at my feet, falling one by one, all my three sons, between the fifth and sixth day; seeing them no more, so surely had they fallen: I threw myself down, shrieking and creeping over their inanimate bodies, calling them for two days after they died, and calling over until the grief which hunger hath awakened in me shall die out. — *Riccard's Translation.*

Clay Model of the Top of the Door. Auguste Rodin, Sculptor.

as fine as it is original. It is a trio of despair; a drama conclusive in design and propriety of place. It tells the story of the whole door.

And the Dante: he that looks down upon hell. For an expression of a deep understanding of and a penetration into the very soul of him who walked through the abodes of the cursed and saw its endless grief, what could be more complete than this statue. This awful Thinker; seen from his left, he looks like a bird of prey contented with the vengeance he has meted out to the vile of the earth; a composition of physical and mental dominance, an effect of personality seemingly without a rival in all the sculpture of the world. More vital than he of the Medici Chapel, and more to be feared than the motionless prophet who keeps his vigils in the icy loneliness of St. Pietro in Vincula. Here, then, are two works every way worthy of the imperial source that suggested them; as complete, as firm, as living. Of Rodin's power of seizing the most dramatic point of a subject, the group of Ugolino and his sons is a terribly real example.

The impression made by this being is so forcible that it seems more like the half-conscious response of an unburied corpse to the trumpet of the resurrection than the closing moment of a period of torture. So far as delineation of subject is concerned, this group stands quite alone in vividness and dramatic force. It is the horror of the door.

The other important subject included in the scheme of the sculptor is the group of Paola and Francesca di Rimini, the first study of which was too large for the purpose intended, it being over half life-size. It represents the lovers sitting close together with their arms around each other. Its whole expression is the embodiment of accordant love: beautiful in its contrasts of form, delicate and chaste in sentiment. Paolo, the strong, sensitive, tenderly expectant lover; Francesca, the fully confiding and willingly submissive mistress. No note or vibration of this exquisite subject that was not lived by the sculptor while this group came into being. It was exhibited in Brussels in 1887, and criticised because it was nude.

"What! make them naked. Who ever heard of such a thing. It's dreadful." That it was a superb piece of sculpture passed unnoticed.

Of the many studies which the sculptor has made of this subject, the one that will go on the door represents the figure of a powerful man holding to his breast and neck, with all the desperation of undying love, the folded together form of a woman. The composition of this group is as original as the comprehension of the sentiment is fervid. It seems as though the soul of the woman, in its haste to meet her lover, had shot through the air like a thought, to find rest in his arms. Neither figure seems fully conscious of the apparent effort of their bodies, it is like something their hearts alone have done. In no work of art familiar to the writer in which corporeal bodies are represented as going through space without effort is there such a complete expression of this illusion as with the figures on the door, and this group is perhaps the most emphatic of them all. It is the urgency of a great emotion unchanged in identity and individual force even during that mysterious moment when life on earth closes.

The penetrating personality of these five pieces of sculpture, and the varied character of their execution find an abundant counterpart in the other figures of which the door is composed.

The whole structure is about eighteen feet high and twelve feet wide. The door itself, which is immediately under where Dante sits, is not divided into a series of panels, each containing a special subject and treated independently, as great doors generally are, but represents a perpendicular section of the damned world, without apparent background, and with a slight moulding running through the centre from top to bottom.

The formations of rock, sea, fire and cloud are peopled with the phantasms of human beings, syrens, harpies, fauns, furies and monsters; all in more or less movement, according to the desires, emotions or propensities of their natures while on earth, and as affected by their present surroundings. They sail through the air, dive into the sea, dart here and there as though they were possessed, or stand as motionless as death.

The spectator looks through the framework of the door into this indescribable scene. Many of the groups and figures are in full relief, and are placed well in advance of the surface-line of the door, and from them the relief gradually lessens until the dimmest perceived distance shows the vanishing forms in delicate mass or outline.

The frame of the door, composed of small mouldings setting well out from it, is also covered in the most surprisingly ingenious manner with figures of every kind, age and sex, making it appear like the shores of an overflowing sea of uneasy souls impossible to keep within the stately authority of an architectural form. The sculptor, more pitiful than the poet, grants a little respite to these unfortunates, and permits them to leave their direful abode. Or, carried away with the endless procession he has unguardedly set in motion, and in no way restricted by the arbitrary topography of the poet, he in very truth lets Hell loose, and the limits of that locality are only bounded by the imagination of the artist.

After the first large sketch of the entire structure had been determined upon, the sculptor intended to model the sculpture in wax on its background of plaster, but as this material was found to be too expensive, clay was used in its stead. The figures were then cut off in pieces and sections, and cast in plaster. The present task of the sculptor is the further finishing and replacing them in their proper order and composition. The size of the figures vary from six inches to about four feet in height. If the reader remember the very modest price which Rodin received for the statues he sold to the Government, he may correctly surmise that the amount paid for the door is still more modest. For the price of his own work in making the plaster model the sculptor cannot be very exacting, but for its reproduction in bronze it is an absolute condition that it shall be by the wax process. And it may be here added that the French nation, in the large majority of cases, owes far more of its art-glory to the individual sacrifices of its artists than to any organized influence.

The large unfinished panel, or the tympanum of the door, before which Dante sits in silent state, contains two subjects, that on his right, "The Arrival," and the one on his left, "The Judgment." The first represents a crowd of spirits pushed on by relentless destiny in hurried disorder to the bank of the Styx, where they await the arrival of Charon's boat. The central figure of this part of the panel is a kneeling female satyr clasping her hands behind her head. She personifies sensual passion, and expresses in her position the consciousness of her condition and readiness to accept the coming punishment.

The principal figure of "The Judgment," is a young girl whose right hand is raised to her chin, the latter meeting it at the shoulder, while her left arm is extended near her body. If any distinction can be made in regard to the character of the sculpture on the door, this statue would be called the most beautiful. Beautiful in every sense, in its life, naturalness, delicacy of outline and exquisite sensibility of modelling. It is a delicious consummation of girlish despair. If an unexplainable fate has placed her among the lost when she ought to have bloomed in Paradise, it remained for the humane artist to reverse the judgment and preserve her as an embodiment of innocence, a joy to the hearts of the generations that will see her here.

This figure, like many others made by the sculptor without reference to any personality, has suggested to the minds of writers and others a variety of names, though it has no name. It may be selected as an excellent example of the character of Rodin's art temperament. He works from the force of the sentiment that possesses him, that he lives, and not from the motive of any given name or outwardly defined subject. The Ugolino group is the chief point of interest of the right-hand part of the door, and is placed on a line with the eye of the observer.

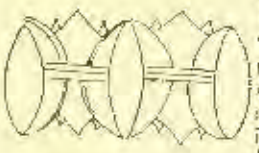
At its left there will be a group of human and half-human figures surrounding "The Three Syrens." These syrens, unearthly creatures, weird and seductive in every form and movement, make perhaps the most subtle composition on the door. No illustration can give any idea of their charm and color, for their beauty begins and ends with themselves. It is just praise to say that they are beyond the reach of the camera.

Just behind them stands a splendid youth, in full relief, with his hands clasped over his head, looking in wonder at a kneeling female figure at his feet, and perfectly unconscious of his woeful surroundings. Above him is a group, also in full relief, of the noble figure of a man, and three equally fine ones of women, the latter representing fear and uncontrollable grief. A short distance below Ugolino a narrow panel begins, which has two central pieces of masks of those who have died in misery, and the spaces on each side are filled with an illustration of the festival of Thetis and Peleus when invaded by Centaurs. Thoughtless pleasure is personified by a youth borne on the back of a syren, who is about to dive into the sea carrying her joyful and unconscious victim with her.

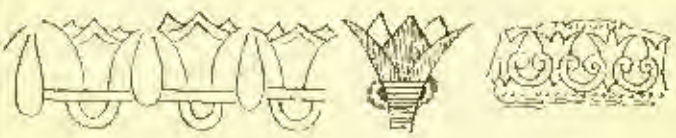
[To be continued.]

THE LOTUS IN ANCIENT ART.[1]—V.

THE EGG-AND-DART MOULDING.



DURING the study of the Cypriote pottery in New York which was prompted by Mr. Clarke's article on the capital of Neandreia, I observed some vases with lotus borders suggesting an analogy with the "egg-and-dart" moulding. One of these borders is shown in Figure 1. A little examination and comparison proved this decoration to be a double lotus border, of which one side appears in 2, taken from another vase. In this border the dart appears in primitive form as the central triangle of a simplified lotus resembling 3. The ovals



4

corresponding to the "egg" of the moulding are formed by the connecting exterior curves of the flowers. Between the flowers, *i. e.*, in the middle of each oval, is placed a bud.

This observation was assisted by the comparison with a decoration in bronze found at Olympia (4) bearing some resemblance to the moulding in question, in which the motive is a simplified lotus form corresponding to 5.

It then occurred to me that the excavations at Naukratis in the Nile Delta ought to have revealed some traces of this connection if it really existed.[2] I accordingly turned to the then recently issued publication of the Egypt Exploration Fund, "*Naukratis I*" and found the conclusive demonstration. This is offered by the architectural mouldings herewith which are copied from the plates in

5 6 7

"*Naukratis*." Nos. 6 and 7 are clearly lotus borders in relief. When reversed they are "egg-and-dart" mouldings (8, 9). If the mouldings of the Erectheum are compared and reversed in the same way, it appears that they are simply deeper cut modifications of the same motive (10, 11).

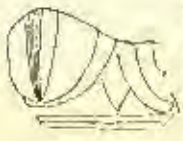
From the same Ionic temple at Naukratis comes the column necking shown at 12, which corresponds to the necking of the columns of the Erechtheum. In this modification of lotus border the forms looking like spear heads on either side of the lotus nearly resemble

[1] Continued from No. 606, page 202.

[2] Naukratis was ultimately the only Greek colony of the Nile Delta because ultimately the trading privilege was confined to it, but the Greeks were never confined to this spot as individuals. They formed the most important mercenary force of the Egyptian kings from the middle of the eighth century B. C., until the Persian conquest, 525 B. C. The excavations at Naukratis date from 1885.

the buds of the blue lotus, which occasionally have the same square angled section. This is attested by the botanical cut of the buds of the blue lotus in the *Description de l'Egypte* as well as by personal observation from nature. It is quite likely that the forms were mistaken for spear heads by the Greek artists. The diamond-shaped form looking like an arrow head above the lotus proper in (12) is not more remote from the central lotus calyx leaf which was its original form than are the exterior spear heads from buds.

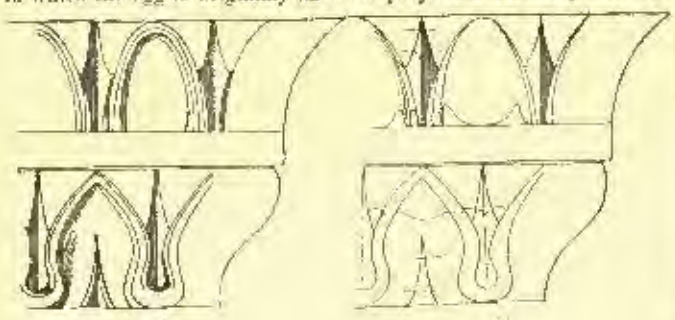
8



9

Comparison of the lotus buds on the ovals of 2 with the design on the relief oval of 6 shows that this also is a bud and the elementary original form of the pointed decoration seen on the "leaf" oval of the Erechtheium (10, 11). The "egg-and-leaf" moulding, so-called, seen in one line of the Erechtheium moulding, is of course only a modification in outlines of the "egg-and-dart."

It thus appears that the "egg-and-dart" moulding is a decoration in which the egg is originally an oval projection resulting from the



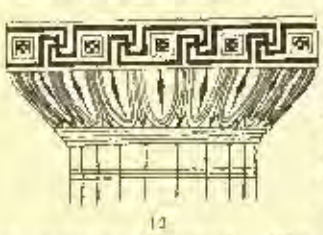
10 11

incised cutting of a series of simplified lotuses placed side by side.[1] It is well known that the ornamental motives of Egyptian architecture were mainly painted rather than incised. It is also a matter of general information that the development of ornament in Greek Art was one from decoration by color in flat to decoration in low relief and that the incision grows deeper and the relief higher according to sequence of time. Under-cutting first appears in the Greco-Roman art and this also grows in extent and depth according to sequence of time.

According to the foregoing observations the supposed "leaf" decorations found in color on the capitals of the Doric order and elsewhere (Figure 13) will also reveal themselves as reversed lotus borders.

After making the foregoing observations I was somewhat disappointed to find that they had been partially anticipated by Owen Jones as early as 1856. According to the prefatory remarks of the "*Grammar of Ornament*" the "egg-and-dart" moulding is derived from an Egyptian border in which lotuses alternate with bunches of grapes. The bunches of grapes are said to be the origin of the egg. An example of this border is shown in the "*Grammar of Ornament*." The illustrations offered in this paper from Naukratis make the hypothesis as to the bunches of grapes quite unnecessary. It is not from one of the rarest but from one of the commonest forms of Egyptian border that the Greek moulding is derived. The oval is simply formed by the side outlines of adjoining lotuses. In this sense my observation as to the "egg-and-dart" moulding is novel as far as my reading has carried me.

17



12

Another partial anticipation of my observation on the "egg-and-dart" moulding, was made by M. Leon de Vesly in 1871 and published in the Journal (*Annales*) of the "*Société Centrale des Architectes*." M. de Vesly transports the "fir cone" which according to my views has disappeared in Assyria into the heart of Egypt and places it in alternating arrangement with lotuses as the origin of the "egg." M. de Vesly has clearly been misled by the bulbous form of the lotus buds in the border in question (see the bulbous bud of the rose lotus, from nature, in my last paper). "Fir cones" are unknown in Egyptian ornament, but the mistake is equally clear in either case. The bud is placed on the oval (see 2, 6, 10 and 12). There is no case of an Egyptian border in which the oval itself is formed by the bud and no case in which the bud can be assumed to have formed the starting-point of an oval. (It is worthy of remark that a projected "egg" moulding without the dart is as old as the fourth dynasty, as appears from an illustration in M. Dieulafoy's "*Monuments Antiques de la Perse.*")

[1] The "dart" is an ultimate rudiment of the central calyx leaf.

The importance of the fact to which this paper is devoted is not to be judged by the brevity of the demonstrations. The intimacy of relations thus proved to have existed between Egyptian and Greek decorative art reacts on the whole argument as to the importance of Egyptian lotus forms as basis of early Greek ornament in general. Any supposable inherent improbabilities as regards, for instance, the Egyptian origin of the Ionic capital are entirely removed by the demonstration for the moulding which is constantly found on it. The Greek colonies of the Nile Delta dating from the eighth century B. C., precede by three centuries the present known cases of a developed Greek "egg-and-dart" moulding and abundantly explain the Egyptian influence in question. Wm. H. Goodyear.

[To be continued.]

THE INTELLIGENT BUILDING-COMMITTEE.

M. SUFFIT reports in *L'Architecture* the transactions of a special meeting of the Council of Architecture of an imaginary department called on the twenty-ninth of February last to consider the designs for a town-hall, which have been prepared by Mr. Beauplan, architect, and have been awarded the highest place by the jury of experts. Mr. Beauplan's drawings are spread out on a table, and are examined with much interest by the members of the Council who have arrived earlier than the rest, and who occupy the time in exchanging views upon architecture in general and architects in particular.

"Yes, my dear Mr. Hedgerow," says the legal member of the Council, evidently in conclusion of a long story, "the architect had forgotten the stairs in the house; just think of it."

"I can easily believe it, my dear sir, for the same thing happened to the architect of a cousin of mine. I have often heard my aunt say ——"

"There is nothing surprising about that," interrupts another. "They are always doing something of the kind, and I could tell plenty of stories of similar forgetfulness. The explanation is very simple: the stairs are in their way, and so they suppress them."

Then everybody laughs.

At this moment the President of the Council enters. All the members seat themselves, and the President announces that the object of the meeting is to examine and pronounce upon the merits of the design submitted, and to make such suggestions as may seem advisable, which, if the Council so decides, will be followed by making a modified design in conformity with them.

The architect is then invited in, and the legal member takes the floor. He begins by felicitating the architect upon his manner of laying washes of India-ink, about which, as he says, he happens to know a good deal. He would like, however, to inquire why the entrance-hall is placed over the vestibule, and why there is no stairway from one to the other. "Ordinarily," he adds, "these two apartments are on the same level, and open directly into each other." "You see," he remarks to the architect, "I know something about these matters."

"But," expostulates the architect. "But?" repeats the other angrily, "I have eyes, and I say there is no staircase shown."

"But," persists the architect, "the drawing before you is a floor-plan, and the rooms are shown on a level, not one over another."

"Oh, then this is a floor-plan, is it? Why is it not written so on top? You cannot expect people to guess at these things. Let me advise you, Mr. Architect, to put always on top 'Floor-plan'; then people will understand."

"Mr. Architect," gently inquires Mr. Goodman, the President of the Charitable Association, "are your plans made by hand?"

"Ordinarily, sir, we make them by hand when we have time enough."

"Ah! I have heard that there are machines for that. I suppose, in fact, that you could hardly do it all yourself."

Mr. Shorts, President of the local grange, takes the floor. "Why do you have so much black on this drawing, Mr. Architect?"

"Those are shadows, sir."

"Now stop right there. You acknowledge that they are shadows. That is unfortunate. In a town-hall it is very necessary to be able to see clearly. No one wants to have the gas lighted all day long. I see you have no windows in your section; that is why you have to make those black shadows."

"But the windows are not on that side of the section."

"Well, then, put some there. I tell you that we must have light. What do you say, Mr. Beetroot."

"I am entirely of your opinion, my dear colleague, but permit me to ask Mr. Beauplan one question: Why are the shallows in your section surrounded with red?"

"That, sir, is the conventional color for showing sections."

"Oh, dear me, what do we want with the Convention and the Sections. You know we don't want political emblems on our plans. I advise you to rub out that socialistic red, and put red, white and blue in its place."

Here Mr. Hairygoat, member from a manufacturing town, leaps to his feet.

"Mr. Hairygoat," says the President, "you have not the floor."

"I know it, Mr. President, and that is why I take it. I vote for the red, do you hear. That is the color of the supremacy of the public, and a town-hall is a public building."

The President: "Well, gentlemen, to satisfy every one, I will ask the architect to make one side of his section red, and the other red, white and blue."

Enough of this. Mr. X., member of Congress for this district, has the floor.

Mr. X. rises. Profound silence. "Gentlemen, to the interesting objections which have already been made to the plan, I will add only one, relating to the façade. Why, I would like to know, are those lead-lights put in the windows? In our town, we built last year a lock-up, and there were no lead lights in the windows; yet every one said it was a splendid building, and it was done by the best mason in the town. We have no millions to spend on our buildings. We must keep the cost moderate. What do you think, Mr. Senator?"

"I think that the public interest must be guarded. Mr. Architect, do not forget to have weather-strips around the doors. They keep out the cold in winter."

The President: "Has any one anything more to say? The meeting is closed."

PFEIFFER'S AMERICAN MANSIONS.

WE have been not a little disappointed that the architects of this country, giving due weight to the circumstances, have not accorded a more hearty support to the proposition that was submitted to them last autumn in the form of the subjoined circular:

BOSTON, November 15, 1888.

DURING the past ten years or more of his life, the late Carl Pfeiffer, F. A. I. A., of New York, busied himself in preparing for publication a work on American Domestic Architecture, and during this time had prepared with much elaboration over three hundred drawings.

The executor of his estate, finding it necessary in the interests of Mr. Pfeiffer's family to realize all that was possible, has asked us to undertake the publication of this material. This we have consented to do, provided that the members of the architectural profession, taking the circumstances into consideration, will assure us by their subscription that the undertaking will be of value to the beneficiaries.

On examination, we find that from the material there can be selected 100 plates, 14 x 18, which we propose to publish in five parts, each part containing twenty plates, at the price of $1.00 for each part, payable on delivery or for the entire work in advance; and you are invited to signify your willingness to subscribe for the work by filling out either of the annexed forms.

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Those who have subscribed for the work have done so with expressions of warm approval of the undertaking, but the plain fact is that unless a greater number of subscriptions can be secured the benefit accruing to Mr. Pfeiffer's family is likely to be but small.

If any of our readers have overlooked the matter, we ask them, once more, to send in their subscriptions at once.

SOCIETIES

BOSTON ARCHITECTURAL CLUB.

THE regular conversazione of the Club was held Wednesday evening, May 8. During the week the successful drawings of the past six years in competition for the Rotch Travelling-Scholarship have been on exhibition at the rooms of the Club, and the conversazione was entirely devoted to an examination and discussion of these, while at the same time, the general subject — the scholarship, its aims, methods and achievements, was considered in detail. Prof. F. W. Chandler of the Institute of Technology was the first speaker. He spoke of the advantages of just such training as competition for the scholarship can give a student, and expressed regret that so few of our younger men should have presented themselves for the recent examination; a problem such as that worked up by Mr. Bacon, the successful competitor for this year, is a great help to one not only in a general way, as influencing the ordinary problems of everyday office practice, but is also the very best preparation for a trip abroad, enabling one to more truly appreciate Europe and its monuments. While the advantages which would accrue to any one travelling under such a scholarship, the special opportunities for study and research which would be offered only to one who is, in a measure an official delegate from the profession in this State, are such as would make the prize worth far more to the holder than the mere amount of money which he receives with it. Prof. Eugène Létang was called upon by the Club, and responded with some excellent criticisms of the competition drawings, continuing Professor Chandler's remarks about the value of serious systematic study. In the general discussion which followed many suggestions were offered in regard to the scholarship; and the general sense of the meeting seemed to be that it was perhaps desirable to hold the competitions earlier in the year, at a time when architects would be less busy with office-work, and the draughtsmen would consequently be more free to compete; and it was questioned whether the scholarship, which is now open only to those who have been employed two years in the office of a Massachusetts architect, should not be extended to any one, no matter what his previous training, who was able to successfully compete for the prize. It was also suggested that the labor involved in preparing the competition drawings might be lessened by having a preliminary sketch made by the competitors, and from those offered, three to be selected for a final competition. In reply to inquiries as to the expense which the competition entails upon those who enter it, several who had taken part during past years agreed in stating that the total cost to a student, aside from the time, need not exceed ten dollars, as that amount would cover all strictly necessary outlay.

The meeting was closed with a description by Professor Létang of the manner in which the competitions are conducted for the Grand Prix de Rome, in Paris. The attendance was quite large and a great deal of interest was evinced in the scholarship and the prize drawings.

THE SKETCH CLUB OF NEW YORK.

WILL you please announce under heading of "Societies" that the Secretary of the Sketch Club of New York may be addressed at No. 37 Broadway. Very truly, WILLIS FOLK, *Secretary.*

COMMUNICATIONS

A STAIN FOR BRICK WALLS.

AKRON, OHIO, April 22, 1889.

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NOTES AND CLIPPINGS

SEVILLE CATHEDRAL. — The ruinous condition of Seville Cathedral has become so serious that the Spanish Minister of Public Works has appointed several eminent engineers and architects to go down and report on the state of the cathedral, and the best plans for rebuilding this magnificent specimen of Gothic architecture. At least ten million pesetas would be required to rebuild the famous cathedral and the Giralda tower. The repairs attempted last year, when several pillars in the central nave were discovered to be in a ruinous state, have proved insufficient, many more pillars in other parts of the cathedral being in a very bad condition. The Government is disposed to ask Parliamentary assistance for the Seville Cathedral restoration, as the subscription started in 1886, under the patronage of the Queen-Regent, has not been very successful. The decision has been arrived at none too soon. For many years past this magnificent specimen of Mauro-Gothic architecture has been falling more and more into decay, until temporary repairs are no longer sufficient to stay the ravages of time. Pillar after pillar has fallen away, and, unless the roof is speedily strengthened, the famous church which for ages has attracted sight-seers to the capital of Andalusia will be in imminent deadly peril of collapse. A subscription was opened last year for a repairing fund. But money is not readily extracted from a Spaniard's pocket, and 10,000,000 pesetas — £400,000 — is a heavy sum to collect in a poor country, where every other city has a church which it considers the finest, or among the finest, in Christendom. Accordingly, Parliament will probably be asked for help, and it remains to be seen whether the Cortes, which requires all the funds at the disposal of the Treasury for needs far more pressing than the restoration of old buildings, will be inclined to take the same view of the matter as the rest of the world. For the Cathedral of Seville, and above all, the Giralda Tower, which forms part of it, have been, like the Alhambra and many other remnants of the palmy days of the Moorish rule in Spain, in one sense

the property of mankind at large. In truth, it is a question whether the hundreds of painters who have drawn it and the thousands of visitors who have admired it have not appreciated the building quite as fully as the race who are its custodians. Seville without the Giralda would assuredly be a pleasant town. At this season it is scented with orange blossoms and embosomed in joyous greenery. But without this most celebrated of its "lions," the place would fall in public esteem to the level of any other sleepy provincial city. The Giralda is the first of the spires of Seville to come in sight, and the first to be visited. The omniscient schoolboy of Macaulay could tell how the lower part of the tower was built in the latter half of the twelfth century, by order of Sultan Abu Yusuf Yakub, and the upper portion, with the belfry, surmounted by the bronze figure of "Faith," by Fernando Ruiz, 400 years later. The cathedral is now the larger of the two structures. But, historically, it is simply an accretion to the Giralda.—*London Daily Telegraph.*

Floating Exhibitions.—Floating exhibitions seem to have taken, at least so far as Germany is concerned. The German Export Company has decided to apply the sum of £250,000 (5,000,000 marks) to the building, equipment and working of a very large steamer, which is to serve as a floating exhibition. The vessel in question will be called "*Kaiser Wilhelm*," and the principal dimensions are as follows: length, 664 feet; breadth, 66 feet; depth, 40 feet; so the question is not of a small craft. The steamer is to have four engines, entirely independent of each other, and four propellers. She is to be fitted in exceptionally good style. The expenses for a two years' tour are calculated at £187,000, while the takings for hire of room and profits on sale are expected to reach £368,000, leaving the very handsome profit of more than £200,000. The steamer will, according to the present arrangements, be ready to start in the spring of next year. A previous undertaking of a similar nature, the steamer "*Gottorp*," despatched from Hamburg, is understood to have given a satisfactory result. Not only are German goods being shown in many different parts of the world, but the staff accompanying steamer has ample opportunities for studying in each place the various local and special requirements, and to see to what extent and in what manner the different wants are being supplied, either by home or by other foreign makers.—*London Engineering.*

Liability of Landlords of Furnished Houses.—When *paterfamilias* packs up his traps and conducts his family to the seaside, one of the expenses for which he makes provision in his estimates is the doctor's bill for the typhoid, which may be contracted in the lodging-house, where it takes up a permanent billet, says the *St. James Gazette*. Will he mend matters if he shuns the delusive "Apartments To Let," and takes the whole of a furnished house? No: he will catch the typhoid all the same; but he can get damages out of his landlord, and that is a comfort, if he only lives to bring his action. Let not the worthy man imagine that he has a similar remedy for a similar grievance against the landlord of his house in town. The rule which was once again laid down recently in Charsley vs. Jones is only applied to "furnished houses," as to which there is, in the eye of the law, an implied undertaking that they are fit for human habitation. With regard to the ordinary house leased in the ordinary way, there is no such legal fiction. If the new tenant wishes to make himself safe, he must get an express undertaking from his landlord; or, if he likes, he may call in a sanitary adviser, who will explain that for the outlay of an amount equal to about three years' rent he can make himself tolerably safe against drain fever, provided, of course, that his neighbors have taken the same precautions.

An Underground Railway for Paris.—M. Berlier has laid before the Société d'Encouragement a scheme for an underground tubular tramway for Paris. There would be three independent lines: one from the Place de la Concorde to the Bois de Boulogne, a length of about two miles; another from the Place de la Bastille to the Place de la Concorde, about three miles long; and the third from the Porte de Vincennes to the Place de la Concorde, a distance of nearly five miles. The plan suggested is to have a circular iron tube, 18 feet, 4 inches in diameter, containing a double line of rails of 3 feet, 7 inches gauge. The service is to be carried on by single cars, driven by electric-motors, and running at intervals of one minute. The rate of speed would be much greater than with omnibuses, and stations would be built at various points. The cars are to be lighted electrically. M. Berlier estimates the cost of these lines at £2,100,000, the annual working expenses at £90,000, and the annual receipts at £240,000. It will be noticed that the whole scheme appears to be founded on the London, City and Southwark Subway, with the only exception that the up and down lines are to be placed in the same tunnel, instead of in separate tunnels, as is the case in Mr. Greathead's subway.—*Industries.*

TRADE SURVEYS

Manufacturing, railway and commercial statistics for April and the first four months this year just published, indicate an expansion of business in the aggregate, a decline in margins and profits, and an exceptional lull during the past few weeks. Development has been irregular. Certain industries and commercial lines have prospered, while others have lagged behind. A careful study of all facts affords instruction if the deductions are properly drawn. financial authorities who have recently spoken on the business showings so far this year, intimate that there are evidences of a possible stringency in money, that the conditions to create it are at work, that the needs for a larger volume of money are increasing, and that the element of risk in business and in investments is increasing. These deductions, if true, are important, but it is easy to recall numerous prognostications by financial authorities in past years that were proved incorrect. Industrial observation and experience, however, corroborates these views in a measure; while the money in circulation in the country is the largest ever known, viz., $1,414,000,000, the enormous investments temporarily unproductive are having the effect of creating an apparent stringency in speculative circles, but not elsewhere. The bank clearings for the first quarter of the year show an increase of 17.2 per cent over last year, and yet jobbers and retailers complain of widespread dulness. The explanation is that wholesale activity in anticipation of future retail demands has not been impaired. The general Government has in cash, $313,974,512; the Government deposits in National banks foot up $48,869,815; Government receipts for April, $41,488,793; disbursements, $22,457,781. Among the railroad probabilities of the near future are an alliance between three or four of the larger American and Canadian railroads, by which the smaller roads now running at a loss will be saved, and a new through route under a centralized control created. The railway situation continues unsatisfactory. The United States Senate Committee is this week seeking information from the highest railroad sources concerning the effect of the Interstate Law on railroad earnings. It is only a question of time for a conflict to arise between the public and the railroad corporations over the existing laws. In the industries prices are still receding, and this is the secret of the dulness. One leading Pennsylvania iron-maker dropped prices $1 per ton, to shut out Southern iron which is every month becoming more pronounced. Six new blast-furnaces are nearing completion in Northern Alabama. The iron trade is suffering; last week rails dropped $1 per ton, and $25.50 at mill is now threatened. Lake-ore miners are booking immense contracts; mills and furnaces are being put in shape for greater activity. Confidence in a mild summer revival of activity is widely expressed, and locomotive and car-builders are slack, but skilled-builders have not room or plant enough to take all business offered. The coal trade is dull; anthracite producers will soon have facilities to store between three and four million tons, which can be made to cover two to three months' demand in case of a strike. Threatened miners' agitations in the Western States have been nearly all adjusted. Two strikes occurred in the building trades, one in Chicago and one in Pittsburgh; elsewhere quietness prevails. Building activity is phenomenal; between four and five thousand houses have been started this year in Philadelphia, and in Pittsburgh manufactures are driven into suburban localities for sites. Among machinery-makers there is great activity, especially for heavy machinery for mill, mine and factory use. Despite the dulness in manufactured products, there is a very general extension of capacity. Cotton mill-building in the South continues, and the promoters and investors refuse to be frightened at pessimistic warnings; all the favorable conditions in the South, heretofore referred to, continue. The lumber manufacturers have been successful in maintaining prices, especially in hard woods, and an expanding market is helping business among machinery-makers. A poplar convention was held in Cincinnati on Tuesday, to take further advantage of the bettering conditions. Lumber is reaching market from a much larger number of places than a few years ago, and hence the influence of lumber centres on the market is declining. Building material has held its own; nails are $1.60 to $1.90 East, and $2 West for steel and $2.40 for wire nails. Barbed-wire manufacturers have more business than they can do at present; sheet-iron mills are quite busy; long gas-pipe lines are to be laid this season. The consumption of all kinds of material will be large and continuous; but, owing to the enlarged capacity during the past twelve months, buyers are not obliged to place their orders two to four months in advance as formerly. The reports from architects are quite encouraging. Fully as much work is on the boards as at any time for years. The generally improved character of work has increased the demand for skilled assistance in building work, and a larger number of young men are engaged now than ever in the history of the profession. As heretofore stated, much work is being done in the smaller cities and towns.

The efflux of manufacturing capital and capacity from larger cities continues on a large scale. Annexes are springing up, and numerous little industries find existence possible where rent, power, fuel, labor and taxes are 10 per cent less than in populous centres. The extent of this industrial rearrangement is greater than supposed, and hundreds who are contemplating the establishment of shops are looking for opportunities in entirely new locations. Foundries, saw-mills, wagon-shops and machine and boiler shops and the like are multiplying throughout the interior and west of the Mississippi. There is a constant cheapening in the cost of fuel and manufacturing interests in the far West which have been checked by excessive prices for fuel, now see reductions within their grasp amounting to 25 to 40 per cent. This means a rapid surge of industrial life in the near future. A new field for American enterprise is opening up in Honduras and in Central American States. Railroad enterprise is proposing to build a line of road in Honduras that will stimulate the development of the supposed richest silver mines in the world, and in the development of the fruit, mahogany and rubber trades. Then recent schemes have been started looking to the establishment of steamship lines, and inquiries as to cost of vessels have been made within two weeks at Delaware River ship-yards. A copper mine said to be the richest in the world, according to the customary enthusiastic report, has been developed in Mexico, and promoters are hard at work at it. The Paris speculators are in feverish anxiety as to the probable extent of their losses, concerning which cable reports are unsatisfactory. The development of new and rich mines of precious metals is very important in view of the rapid expansion of trade and commerce throughout the world. More gold is needed, and whatever differences of views may exist regarding the utility of paper money, gold and silver is in demand, and the need of it will grow possibly more rapidly than the supply. Some financiers, who study the mining interests, look for a boom in business within a year or two as a result of greater supplies from newly discovered deposits. The production for years past has been practically at a standstill, and it would seem that there is a great need of an increased supply of precious metals. Experts estimate, perhaps rather loosely, that when projected improvements are made the capacity of the Western and Mexican mines will be increased fully 25 per cent. The country certainly needs more gold and silver, especially as there is no easy or practical method of preventing a large and steady draw to Eastern countries, where the demand will doubtless increase as commercial relations become more intimate. Within the past four months American electric-lighting companies have closed negotiations for electric-lighting plants in nearly every civilized country on the globe. The increase in business is marvelous; all electrical, well-equipped companies are crowded with work, and it is evident that foreign work will grow rapidly. Since January 1 estimates and information have been requested by some thirty or more large and small interior municipalities regarding electrical roads. The cost of power is being reduced, and the early clearing up of difficulties in point of economic use is assured. Stores for the prompt distribution of electrical supplies are being established by Eastern companies over the West, and storage facilities for agricultural implements are being extended. Both mining and agricultural operations will be greatly extended from this out. What is now needed to impart an upward tendency to prices is a covering of manufacturing, railroad and mercantile requirements, to no greater extent than is usual, and which would now be covered but for the fact that buyers are not confident that present prices are the lowest. The assurance that rock-bottom has been reached would start demand and give prices an upward tendency.

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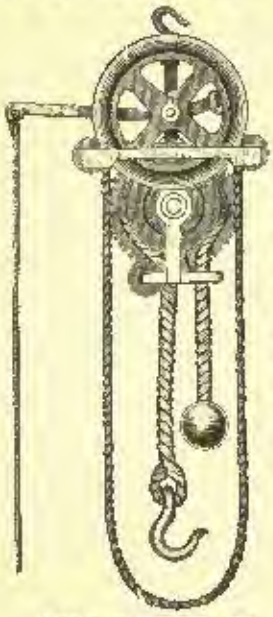

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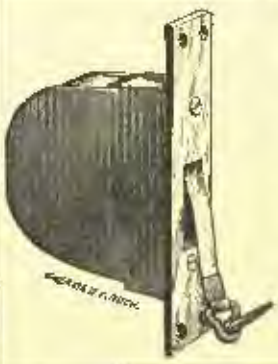

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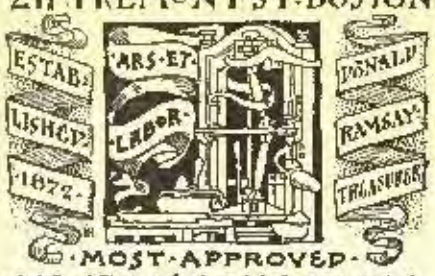

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The American Architect and Building News.

Vol. XXV. Copyright, 1889, by Tichnor & Company, Boston, Mass. No. 699.

May 18, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THERE seems to be some prospect that the so-called Metropolitan Sewerage scheme, by which a large number of country villages several miles away from Boston are to be compelled by the public authority to build enormously costly trunk-sewers, for the purpose, as is alleged, of keeping their sewage from defiling the waters around Boston, may be passed this year. The trifling circumstances that the villages in question have never had any sewers or sewerage, and are never likely to have any, and that the imposition of the burden of constructing and maintaining a huge conduit for conveying what does not exist may very probably put some of them into bankruptcy, appear to sink into insignificance in the minds of the Massachusetts legislators in comparison with the glory of being concerned in the building of thirty miles or so of brick conduit through meadows where wild ducks and sea-gulls will be the only witnesses of the operation, to drain away the "sewage" of towns, whose prosperous market-gardeners pay six dollars a cord for manure, while the cost of connecting the houses of those who will have to pay for the trunk-sewer with it by any kind of conduit would be nearly, if not quite, as much as the entire real-estate valuation of the towns in question, even supposing that there should then be any sewage to convey, and that the original proprietors of it were disposed to give up the advantage of using it on their own land. If there were anything to be gained by the scheme, even for Boston, it would be easier to speak of it with respect as an improvement which Boston might some time be disposed to carry out at its own expense; but as the inhabitants of the water-front of Boston, who are now so desirous of purging the air which they breathe from the scent of the sewerage of Newton, Arlington and Waltham, none of which have ever had any sewer or any sewerage, have for a hundred years discharged their own drains through the sea-wall in front of their dwellings, and still continue to do so, while the sediment from the kitchen-sinks of their ancestors, undredged and undisinfected, lies by the acre under their noses, exposed at every low tide, it would seem fitting, to say the least, to wait until there was something about the water-front of Boston capable of further defilement before subjecting the villages in the river-valley above to a ruinous expense in order to forestall the possible addition of a microscopic quantity of bacteria to the vast accumulation which the Boston people look out upon, without any attempt to remove it or check its increase. It is very likely that a few houses or factories on the upper banks of the river surreptitiously discharge their offal into it; but a simple enactment, if there is not one already, forbidding the defilement of the stream, and leaving it to the persons concerned to find other ways of disposing of their refuse, would, it seems to us, answer every purpose, without imposing a fearful burden upon thousands of innocent people who never could, and never would, make any use of the great "trunk" sewers, even if they were built.

THE governors of Massachusetts have been fortunate in the material which they have secured for their State Boards of Health. The original Board, under Dr. Walcott, Dr. Bowditch, Dr. Derby, Dr. Folsom, Mr. Webster and others, made itself and the State which it served famous throughout the world by the thoroughness and originality of its work, and since it has emerged from its eclipse under the shadow of the Board of Lunacy and Charity, with which it was for a time, through some administrative whim, connected, it seems to have entered upon a new career of usefulness. One of the most active of the new members, who has taken up his duties quite in the spirit of those who have preceded him, is Mr. Hiram F. Mills, perhaps the best authority on water-supply in the State, and one of the best in the world. According to the *Engineering Record*, Mr. Mills, since he assumed his duties as a member of the Board and chairman of its sub-committee on water-supply and drainage, has devoted himself to the work of serving his fellow-citizens without compensation, to the serious prejudice of his private practice. Although he has been of late years engaged, perhaps principally, in advising as consulting engineer in matters of water-supply, he has, since his appointment to the Board of Health, declined employment which would have brought him in several thousand dollars a year, on the ground that his public duties would not allow him time enough to attend to it. Fortunately, Mr. Mills is, as we understand, comparatively a rich man; but it is not always rich men who are most eager to work for other people for nothing, and Massachusetts is to be congratulated on being able to command such devotion from such citizens.

THE court-martial which tried Major Lydecker for alleged neglect of duty in relation to the new Washington aqueduct, of which he was superintending engineer, has sentenced him to a fine of one hundred dollars a month for nine months, with a reprimand for his inefficiency. One would think that this was a sufficiently severe sentence for a man whose intentions were perfectly honest, and who, on being detailed to do work for which he had never had any training, simply failed to discover all the thieves who were at work around him, but the newspapers denounce it as too light, and insinuate that it would have been much heavier if Major Lydecker had not been so popular in Washington society. They call attention to the fact that the tunnel, which cost about two million dollars, is so badly and fraudulently built that it is of no use whatever, and the money has been simply thrown away; and then, by a sort of logic which is very popular among dishonest contractors and bad mechanics, inquire why Major Lydecker is not made to suffer more heavily for the "bad and fraudulent work" done by some one else, who is left by the persons defrauded in undisturbed possession of his fraudulent gains, while Major Lydecker is mulcted of a large part of his narrow salary, as a warning to others who may happen to fall into danger of being entrusted with public service in relation to building operations.

A NEW and valuable suggestion is to be found in the account of the recent great fire in New York, which is given in *Fire and Water*. During the progress of the fire, a slaughter-house near the river was threatened by the flames, and some men went on the roof to pour water on the tar composition of which it was made, in order to prevent it from being kindled by the sparks which kept falling on it. While they were thus engaged, one of them was struck by the idea that if the surplus water, which was running off into the gutters, could be saved, it might be made to afford still further protection from the impending disaster. He therefore, with some of his companions, punched holes through the bottom of the gutters, so as to let the water run through. By this means a sheet of water found its way down the walls and over the exposed window frames and sashes, protecting them very efficiently against the scorching heat from the buildings burning in the neighborhood.

A SINGULAR accident took place the other day at Providence, where an elevator, which had been allowed to drop through a shaft fitted with the Ellithorpe air-cushion at the bottom, forced its way through the air-cushion with such violence that the three men who were in the car were thrown down, receiving such injuries that one of them died at the hospital the same night, and the others, although not fatally hurt, received severe injuries. The elevator was made by Messrs. L. S. Graves & Son, of Rochester, and the air-cushion was built by the same firm under a license from the owners of the Ellithorpe patent. The car and the air-cushion had already been tested, once by dropping the car alone, and a second time by dropping it with six hundred pounds of iron in it, and in neither cases was any injury done to the car or the air-cushion, or even to a basket of eggs, which was placed beside the iron in the second experiment. For the third test, the car was dropped with two of the representatives of the builders in it, together with an enterprising newspaper reporter. Whether the air-cushion gave way under the shock, as was the case in a similar test made in Boston some years ago, or whether an unexplained leakage of air through the counterbalance ways, or some other orifice, may have diminished the elasticity of the cushion, is uncertain, but the concussion of the fall was so great that all the men received serious spinal injury, and in the case of the heaviest of them, who happened, moreover, to be sitting on the floor of the car, the injury was fatal.

MR. STANFORD WHITE, whose cleverness in such matters is well-known in the profession, designed a temporary triumphal arch for the celebration of the Washington Centennial in New York. The arch, views of which are probably familiar to our readers in the illustrated papers, proved so pleasing to the spectators that it has been seriously proposed, on the suggestion of the Centennial Committee, to reproduce the arch in permanent materials at the Washington Square end of Fifth Avenue, as a memorial both of Washington and of the celebration. As the cost of the undertaking will be between sixty and eighty thousand dollars, there is some doubt whether the money can be raised for it in New York, which is not famous for the enthusiasm with which schemes for monuments are taken up; but it is not impossible that the advantages presented by the site for such a structure may tempt the rich inhabitants of the neighborhood to subscribe liberally enough to carry the plan through.

THE *Revue Industrielle* has an article on the collapse of the great French copper speculation which will interest a good many owners of shares in copper mines on this side of the ocean. Although the writer of the article thinks that the copper syndicate is still strong, and is in condition to make at least an honorable retreat, he considers that it committed a fatal error in allowing the accumulation on its hands of a stock of copper, so large that prices must inevitably be lowered in order to get rid of the burden of carrying it. At the time of the organization of the syndicate, the annual production of copper was about two hundred thousand tons, and the low range of prices had had the effect of diminishing production, and increasing consumption; copper, as we know, at that time replacing iron for many purposes where iron had previously been used. On the appropriation of the product of most of the mines by the syndicate and the doubling of the price, a change took place. While consumption fell in 1888 nearly eight per cent below the former average of two hundred thousand tons, the production rose to two hundred and fifty thousand, having a surplus of sixty-five thousand tons, which the syndicate was obliged to buy and pay for, in order to maintain its prices. If the syndicate had been satisfied with moderate profits, watching the market so as not to check consumption, and had, by the same means, made it for the interest of the mines to restrict production, the affair might have gone on prosperously, the supply and demand being kept equal, and the accumulation of a surplus avoided, but the moment for this has passed, and nothing can be done until the surplus stock, which now amounts to about one hundred and thirty thousand tons, has been sacrificed to meet the demands of the bankers who have lent money upon it as security.

M. BONNAFE has recently written to the *Journal des Arts* a letter about the preservation of marble statues exposed to the weather, which is very curious. The announcement was made in the official papers that an appropriation had been made for the purpose of cleaning the statues in the garden of the Tuileries and at the Luxembourg, which had not been cleaned for several years, and M. Bonnafé calls attention to the fact that the ancients not only did not have to scrape their statues to keep them looking well, but that they had the art of covering them with a waterproof coating of wax and oil, which gave transparency, and a kind of polish, to the marble, while it prevented dust and the spores of lichens from attaching themselves to the stone. According to Vitruvius, the coating was made by melting together white wax and oil, and putting it on while hot, with a brush. This application was followed by one of tallow, and the whole was then rubbed with soft cloths. Vitruvius speaks of this treatment as being useful for making walls impervious to moisture, and recommends, where it is applied for this purpose, that the wall should be heated with charcoal stoves, as is now done in applying various waterproofing preparations. In modern times the process has been occasionally revived. In 1803, when the fountain in the Rue de Grenelle was cleaned, Quatremère de Quincy, with the two official architects, resolved to apply the antique process as an experiment. After cleaning, the marble of the fountain was warmed by means of charcoal stoves or braziers, and covered with a coat of virgin wax, mixed with poppy oil. After this had soaked well into the marble, more wax was put on cold, and the whole rubbed with soft linen cloths. The result was then considered very satisfactory. The marble was not injured in the least by the heating, and the smooth wax coating was impervious to water, and afforded little lodgment to dust.

AMONG the reminiscences of old Paris, which M. De Cleuzion publishes in *La Semaine des Constructeurs*, appears a story about the first Napoleon which we hope may be new to some of our readers. In speaking of the ancient College de Cluny, which existed until within a few years in the neighborhood of the Sorbonne, M. De Cleuzion remarks that the painter David had a studio for many years in the little church attached to the building, and it was here that Napoleon came to see the picture which, at the height of his fame, he had ordered from the fashionable artist. David had been for a long time at work on the painting, when the Emperor came, one day, to see if his picture was done, and to have a look at it before it was exhibited to the public. As he dashed up, surrounded by his brilliant escort of generals and marshals, and entered the old church in which the painter worked, the curiosity of the neighbors knew no bounds, and they took advantage of every opportunity to see what was going on behind the blank chapel walls. The picture was an immense affair, in the most correct style of high art, representing the consecration of the Emperor; and David had applied to it the canons of the most scientific composition, filling the foreground with the Empress and her ladies, whose flowing robes filled the unoccupied corners, and lent variety and grace to the scene. Considered in itself, it would have been, and still is, considered a fine picture, but its method of treatment did not at all suit Napoleon, who had no relish for figuring in the background anywhere, and least of all behind a lot of women. As the conqueror of the Pyramids entered the studio, he was almost paralyzed at seeing that his own portrait was less conspicuous in the picture than that of the Empress, or even than those of some of the ladies-in-waiting. He paced up and down the room for about a quarter of an hour seeking in vain for words to give expression to his feelings. At last, suppressing his rage, he said, "I thank you, Monsieur David, for having represented me as a true knight." The generals and marshals, who had no idea what he meant, smiled somewhat faintly. "Yes," continued the conqueror, "Deference to the ladies; we must always show deference to the ladies." Then, turning to the painter, with a world of suppressed rage and scorn in his voice, he said, "But what is the Pope doing there?" "Nothing, Sire," said David. "And did you suppose that I had him come from Rome to do nothing?" demanded Napoleon. "He might be represented as giving a benediction," ventured the artist. "It is well; let him be shown giving a benediction," replied the Emperor, and with a curt "Good morning," he departed. The picture was completed, but a new one was ordered from the painter, on the subject of the "Distribution of the Eagles." In the representation of this scene there would be sure to be no ladies to eclipse the Emperor, and David did not need a second hint as to the way in which Bonaparte liked to have the composition arranged in pictures in which he figured.

Pl. 7.

Heliotype Printing Co. Boston.

SKETCHES OF THE AGE OF FRANCIS FIRST.

A COURTYARD OF THE CHATEAU DE BLOIS.

BUILDERS' HARDWARE.[1]—XXVI.

DOOR-KNOBS.

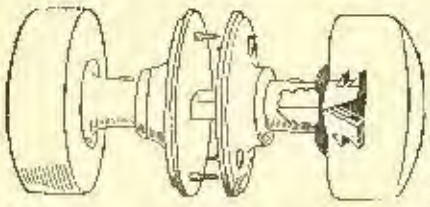


Fig. 379. Wooden Door-knob Attachment. J. B. Johnston.

FIGURE 379 is a form of attachment designed for wooden knobs. The shank is split lengthwise and the ends of the two pieces cut away from each other on a bevel, with wedges or lugs on the outside, the bevels being so cut that when the surfaces are brought together the lugs can enter a hole in the wooden knob the same diameter as the main portion of shank. By then bringing the opposite ends of the shank together, the lugs are forced sidewise into the wood so strongly that they cannot be drawn out except by breaking the parts. A light thimble fits over the shank and into the rose, securing the whole.

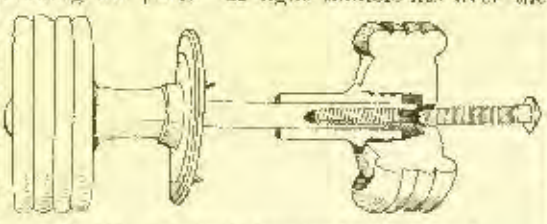


Fig. 380. Hollenback's Expanding Spindle Door-knob.

Figure 380 is a form of knob secured by a screw entering the head of the spindle, at the same time wedging it to any adjustment by reason of the screw being slightly larger than the hole in the spindle.

All the foregoing knobs are constructed with spindle extended through the door and continuous from knob to knob. Some locks are so devised that the spindle is done away with, each knob acting independently of the other by means of shoulders or extensions on the shank. Figure 381 illustrates the form of knob which is used with all of the "Niles" locks. The end of each shank is provided with a shoulder of about the same shape as the ordinary lock follow, acting directly against the latch-lever. The shanks rotate freely in the escutcheons. To apply the knob, the shank is passed through the escutcheon plate and the shoulder or follow inserted in the lock, the latch-lever being pressed back with a flat blade or a screw-driver until the follow can be snapped into position, which is easily accomplished by inserting the shank at an angle. The knob is then brought around square with the face of the door and the escutcheon plate screwed in position, holding the knob so it can be removed only by moving the plate. The chief advantage of this arrangement is that there can be no rattling in the lock. The latch operates the moment the knob is turned, be it ever so little; nor are there any screws to work loose.

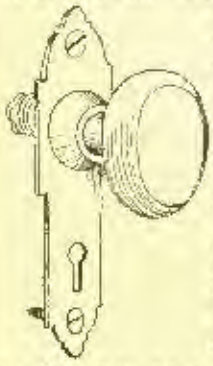


Fig. 381. Niles Patent Knob. Chicago Hardware Co.

The Gilbert Lock Company manufactures a knob especially designed for their locks,[2] the construction of which is illustrated by Figure 382. In this, as in the preceding example, there is no spindle. The knob-shank is secured to the escutcheon, which is boxed out sufficiently to allow play for a lugged plate, turning with the shank and acting against a lever. The latter is hinged at the top and fitted with an arm at the bottom which works in a slot through the lock, drawing back the latch by a direct, lateral action. The escutcheon is secured by long screws above and below the lock. There are some excellent points about this device. There is no spindle to work loose and rattle, no screws in the shank to drop out, and no adjustment of washers or screws, as the knob has a perfect adjustment to any thickness of door without binding. An improvement might be made by so extending the lugs on the spindle plate that when the latch is out, both lugs will bear against the operating lever, in order that the latch may move at once, no matter in which direction the knob be turned. This form can, of course, be used only with "Gilbert" locks.

In regard to appearance, and the materials used, knobs of the following materials are found in the market. In wood, they are made of mahogany, cherry, oak, ash, apple, maple and ebony. Glass knobs are cut, pressed, silvered or of black glass. What are known as mineral knobs are made of earthenware, porcelain or lava and can be had either black, white or grey in color. The metals used for knobs are brass, bronze, silver, nickel and iron. Compositions of celluloid, hematite, etc., are also used. The shanks in all cases are made of either bronze or iron, the latter only in the cheapest work.

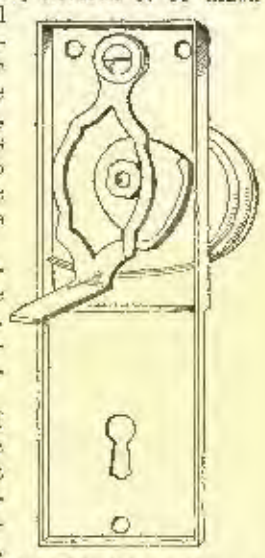


Fig. 382. Gilbert's Lock and Escutcheon. Gilbert Lock Co.

Wooden knobs are generally finished in natural colors, and can be obtained with wooden roses to match. They are very good, strong, and serviceable, and are excellent for interior use.

Glass knobs are somewhat out of style just at present, but are still made in a great variety of forms, both cut and pressed, and are really very handsome in appearance. The silvered-glass knobs are rather cheap looking, though the cost is somewhat higher. Figure 383 shows a few of the great variety of knobs made in glass.

Black glass, and what is known as mineral, and white porcelain are all used a great deal for common purposes. They are cheap, clean, and as generally constructed are quite strong. Lava knobs are used but little.

The greatest variety of designs is found in metal knobs. These are made in all shapes and in all colors. Some of the special shapes will be considered subsequently under the head of styles and design. Some of the styles of iron knobs recently put on the market by the Yale & Towne Mfg. Co., and finished by the Bower-Barff process are very serviceable and pleasing. Hopkins & Dickinson have a very dark rich bronze almost as black as gun-metal which they use for some of their hardware. Of late years oxidized silver has come in as a great favorite for knobs and knob-plates, and is now worked up in a great variety of designs and in several different colors. The Yale & Towne Mfg. Co., has a grade of oxidized silver which almost matches the dark bronze of Hopkins & Dickinson. Metal knobs are made either oval, spherical or in a flattened sphere, egg-shaped and indeed in an almost infinite variety of shapes and designs. In the nicest grades of work, the knobs are always made to order. In some of the very choicest work, knobs are gold-plated. This increases the cost a great deal, to an extent, indeed, which renders it beyond the need of the ordinary market; but the advantage is not so much in the looks, for a gold-plate has exactly the same color as some shades of bronze, but gold-plate is absolutely untarnishable, and will not change its color, whereas all the finishes of bronze,

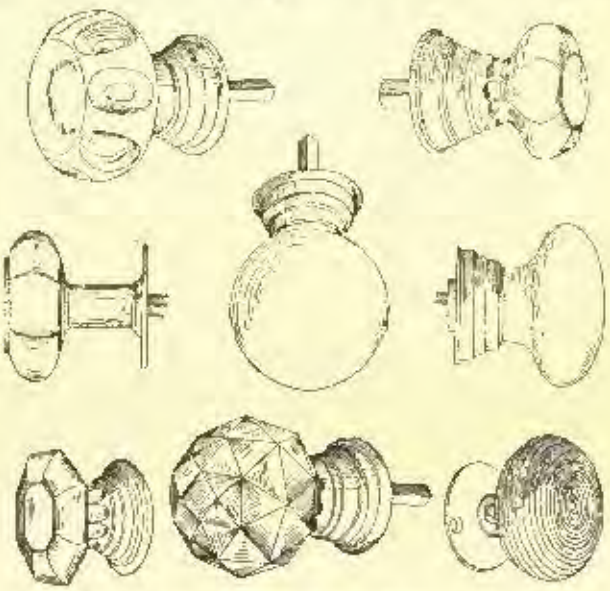


Fig. 383. Forms of Glass Knobs.

[1] Continued from page 230, No. 808.

[2] See Figure 318 in a previous issue for an illustration of the "Gilbert" locks.

silver, brass or nickel, are more or less liable to change. The various finishes for metal knobs have been previously considered in the introduction.

The knobs of the Boston Knob Co., are made of composition, presumably celluloid, or at least of that nature. Celluloid plates are bent over a strong metal frame, and held in position by a brass rim which is shrunk on to cover the joints between the two plates. They form a very neat pretty knob, Figure 384. The celluloid is made in a variety of colors, including several shades of blue, garnet, black, malachite, green, drab, slate, yellow, brown and white. In many cases the varied colors will be an attraction. One would imagine this form of knob made in white with a simple band of brass around the edge might be used very nicely in connection with rooms that are furnished in the prevailing Old Colonial white-and-gold style.

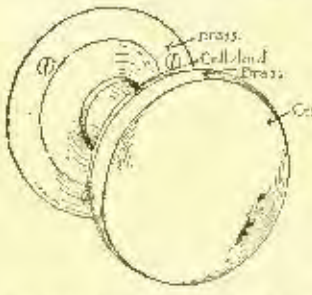


Fig. 384. Celluloid Door-knob. Boston Knob Co.

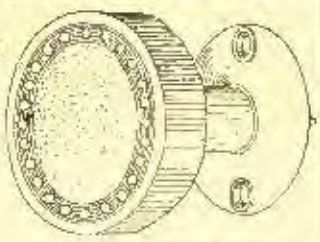


Fig. 385. Hemaelte Knob.

Hemaelte is a composition which as nearly as can be discovered, consists of blood, glue and sawdust. This is pressed in moulds and finished in several different shades, either jet black or a deep rich brown. Figure 385 shows the commonest form adopted for hemaelte knobs. They are usually made with face-plates of brass or bronze, inserted in the front of the knob and the edges of the knob are milled. This composition is most excellent for interior use. It will wear indefinitely and is exceedingly strong and tough; but is not altogether suitable for exterior use as it is said to be affected by the weather.

Besides the ordinary double knobs it is often desirable to have a lever on one side of the door and a knob on the other. Figure 386 shows a typical knob and T-handle. There is, of course, an infinite variety of styles of this sort, some of which will be considered later on. Figure 387 illustrates a so-called ship-handle, consisting of a plain knob at one end of the spindle and a ring-handle at the other. The form shown by Figure 388 is termed a crank-handle, being intended for French windows and narrow style doors. The inner knob is kept away from the jamb so that in opening the door the hand will not be caught. The common forms of pulls or handles employed for sliding-doors have been previously discussed.

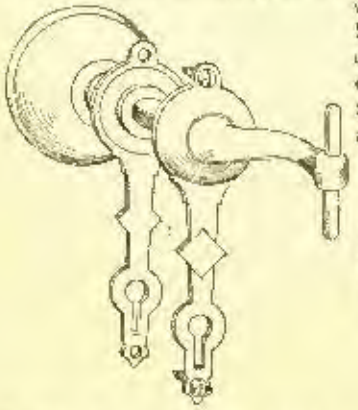


Fig. 386. Knob and T-Handle. Ireland Mfg. Co.

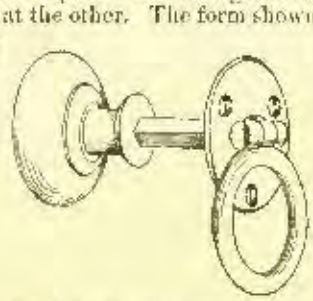


Fig. 387. Ship Handle. J. B. Shannon & Sons.

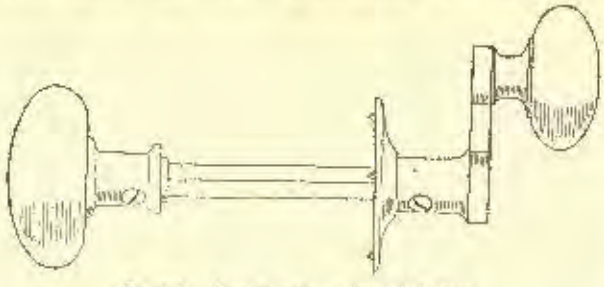


Fig. 388. Crank Handle. Nimick & Britton.

Bell-pulls are usually similar in appearance to door-knobs, and in order-work are made exactly the same, and to match. The internal construction of the spindle however is a little different. Figure 389 shows the commonest form, the rose being provided with a long hub fitting over the spindle, and screwing into the frame of the door. Figure 390 is a form of lever bell-pull suitable for out-door work. The same form is sometimes used for bells in the interior of the house, although Figure 391 is a better and more common form.

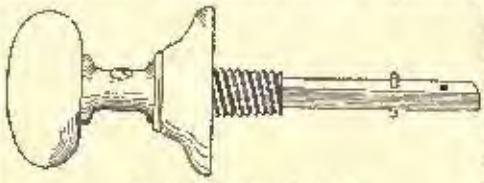


Fig. 389. Common Bell-pull.

Door-knockers are made in a great variety of shapes. A few of these will be considered later on in connection with the designs. A single example, Figure 392, will be sufficient to illustrate a typical door-knocker in this connection.

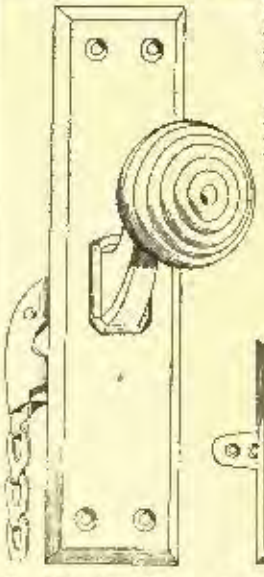


Fig. 390. Lever Bell-pull. Russell & Erwin.

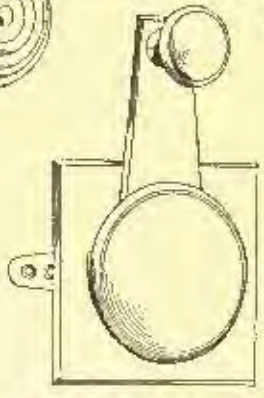


Fig. 391. Parlor Bell-lever.

Fig. 392. Old-fashioned Door-knocker.

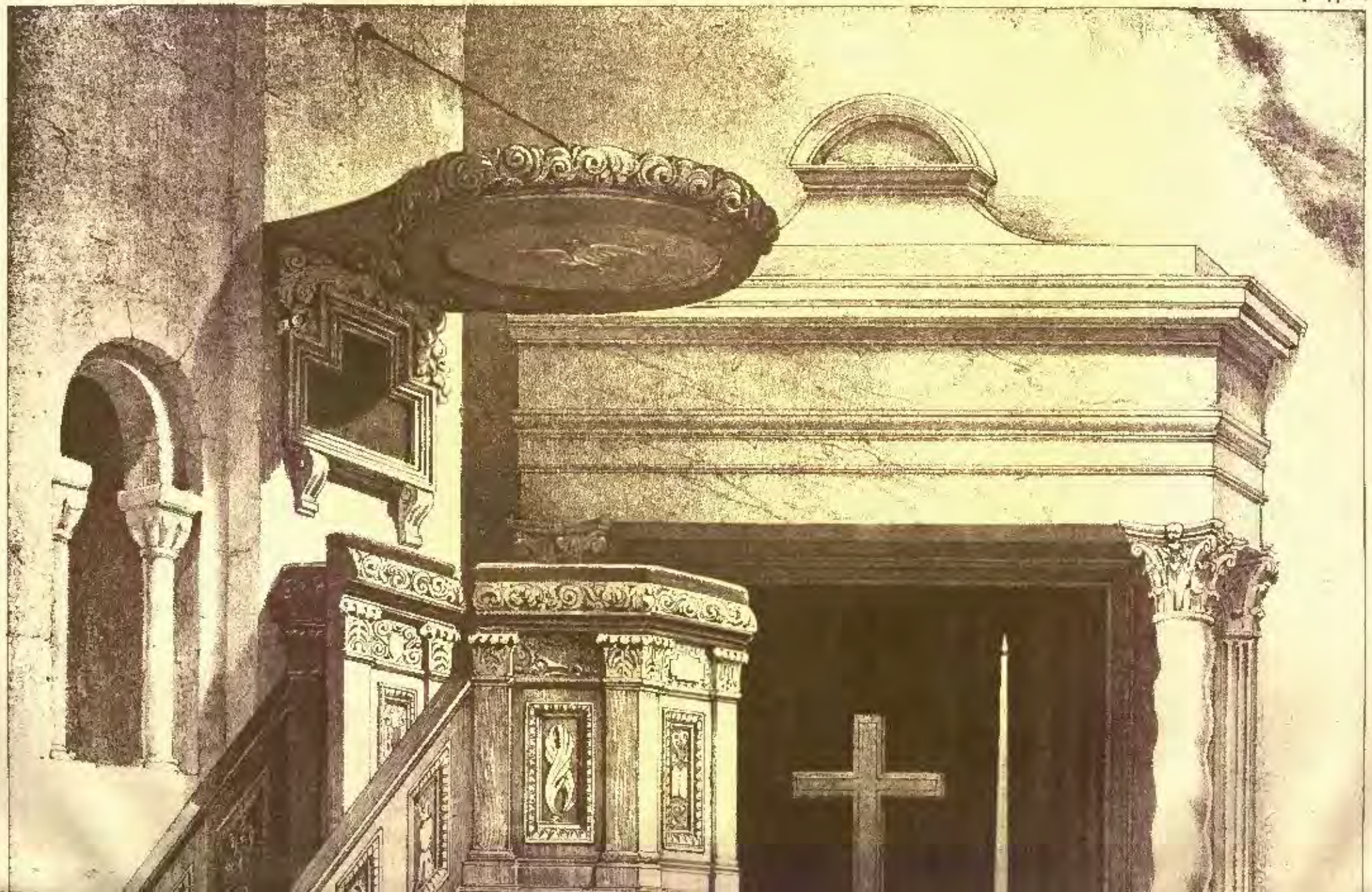
The following table gives the average retail prices of the principal styles of door-knobs. The prices are for a dozen pairs of medium-sized ($2\frac{1}{4}$ inch) knobs, complete, with roses and screws to match.

Table of Door Knobs.

Fig.	Description.	Knob.	Shank and Rose.	Manufacturer.	Price.
367	Knob with concealed Screws	Porcelain	Bronze Plated	Russell & Erwin.	$5.75
369	Screwless Knob and Escutcheon combined	Bronze	Bronze	P. & F. Corbin.	12.50
372	Morrie Patent Door-knob	"	"	Ireland Mfg. Co.	16.00
373	Screwless Knob-stunk	"	"	Yale & Towne Mfg. Co.	18.00
378	Philpe Patent Door-knob	Wood	"	Milford Door-Knob Co.	12.00
379	Door-knob, expanding Spindle	"	"	J. B. Johnston.	7.00
381	Niles Door-knob	Bronze	"	Chicago Hardware Co.	30.00
382	Gilbert Door-knob and Escutcheon	"	"	Gilbert Lock Co.	40.00
384	Boston Door-knob	Celluloid	"	Boston Knob Co.	10.00
386	Hemaelte Door-knob	Hemaelte	Brass and Hemaelte	Dibble Mfg. Co.	6.00
388	Knob and T-handle	Bronze	Bronze	Ireland Mfg. Co.	10.00
387	Ship Handles	Brass	Brass	J. B. Shannon & Sons.	16.80
390	Lever Bell-pulls	Bronze	Bronze	Russell & Erwin.	27.00
391	Parlor Bell-levers	"	"	"	27.00
392	Antique Knocker—each	"	"	—	3.00
—	Common style Door-knob	Pressed Glass	"	—	10.00
—	do.	Cut Glass	"	—	18.00
—	do.	Porcelain	Iron	—	1.00
—	do.	Cherry	Bronze	—	7.50
—	do.	Iron Bronzed	Iron	—	4.00
—	do.	Iron Bower-Barffed	"	—	8.00
—	do.	Plain Bronze	Bronze	—	8.00
—	do.	Figured Bronze	"	—	6.00

There remains but a single door-knob to be considered. Some ingenious person who had been troubled by tramps, or who imagined that everybody else was, devised a burglar door-knob. This consists simply of a knob on the inside of the door, which at the same time is a bell, the mechanism of which years of use will not disarrange. It costs but little more than a common knob and can be applied by any person, the least turn of the outside knob causing the alarm to be rung on the

Pl. 6.



Heliotype Printing Co. Boston

SKETCHES · OF · THE · AGE · OF · FRANCIS · FIRST ·

A PULPIT IN THE CHURCH AT FONTAINEBLEAU

inside so that immediate warning is given of even an attempt to enter. The knob is so constructed that upon being turned from the inside it gives no alarm. It is known as the Burglar Door-knob and Window-alarm, and is manufactured by Wm. C. C. Matthews & Co.

ESCUTCHEONS.

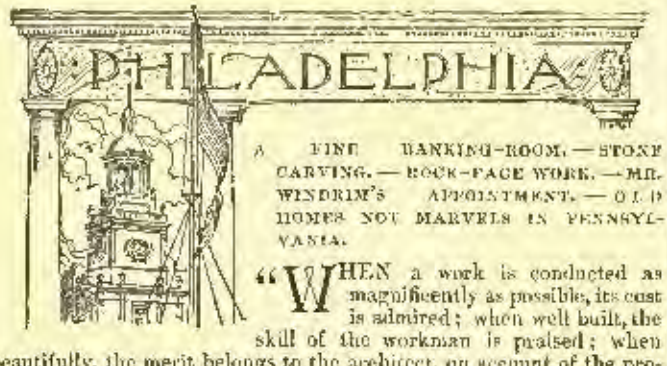
The term escutcheon is used to designate the peculiar locking mechanism of a cylinder-lock, as has been explained in the previous chapter. It is also applied to the finish, of metal or other material, about the key-hole of a lock. Escutcheons are made both with and without drop or covering pieces. For inside work the drop had better be omitted, though for front doors both the latch and the lock key-hole should be protected. The common forms of escutcheons are too well-known to require any illustration.

The following table gives the average retail prices.

TABLE OF KEY-HOLE ESCUTCHEONS.

Material.	Price per dozen pairs with drop and screws.	Price per dozen pairs without drop, with screws.
Iron bronzed	$ .50	$.25
Porcelain	.75	.36
Wood	.85	.65
Brass	1.50	.80
Bronze — plain	1.50	.60
" figured	1.00	.42

[To be continued.]



A FINE BANKING-ROOM. — STONE CARVING. — ROCK-FACE WORK. — MR. WINDRIM'S APPOINTMENT. — OLD HOMES NOT MARVELS IN PENNSYLVANIA.

"WHEN a work is conducted as magnificently as possible, its cost is admired; when well built, the skill of the workman is praised; when beautifully, the merit belongs to the architect, on account of the proportion and symmetry which enter into the design." Whether in mentioning cost first in his list of the admirable qualities of a building, and beauty last, Vitruvius meant to put them in the order of their relative importance is more than doubtful, but his arrangement is very suggestive of the sentiment of the Philadelphia public of to-day. Certainly there never was a time in the history of the city when so much money was being poured out that each company's building might have a showier façade than its neighbor. The "proportion and symmetry" of which the earnest old Roman speaks are quite lacking as a rule, but excepting the use of galvanized-iron (neatly sanded) in some of them, the new fronts are being "conducted as magnificently as possible." A large part of the magnificence is apt to consist in a lavish use of rock-face work of varying degrees of baldness. There would seem to be no valid reason for the sudden outbreak of this style of wall except possibly a vague hope of the architect's that its glaring inappropriateness might startle the beholder into overlooking the childishness of the design. The success of this plan, however, may be doubted, for in spite of their jagged projections narrow piers of stone with broad window-openings do not give the restful effect of — say the foundation of a mediæval fortress — nor do the every-day red brick party-walls that come confidingly up to the very edge of these frowning heaps of perpendicular rock tend to help the illusion. The Pennsylvania Company for Insurances on Lives and Granting Annuities, in the building it is now putting up on Chestnut Street, opposite the State-house, has a front that in spite of the rather questionable taste of its design, shows an admirable way of getting over the rock-face-and-party-wall difficulty. It is crowned by a gable that rises from two huge steps. The risers as it were, of these steps are of course, interior walls below the roof and where they show above it have a surface of the same rock-face as the front. Of course the walls do not run back far from the building line before they are quite hidden from the street, and as a matter-of-fact the front part of the building — five-stories of small rooms — has but little depth. Just behind it comes the huge banking-room — with the exception of the Brussels Bank, the largest in the world. The room is as yet quite unfinished but if its interior treatment is as pleasing as its general proportions it will be an unqualified success, so that the Company's clients, when once inside will be made to forget the outer shell, with its amateurish arrangement of columns and piers and its stupid carving. And that reminds me that it is curious how little attention people pay to carving: years ago it is safe to say that all the stone-carving done on Philadelphia fronts was utterly bad — stupid, spiritless, without feeling, and now that we have good carvers among us — as good in certain lines as can be found in New York or Boston — we persist in using the old so-much-a-yard style without its occurring to architects, apparently, that in many cases a plain surface would be better. It is curious, I say, that men who see every day as they walk down Chestnut Street such good work as is on the City Trust Building should continue to give orders for great quantities of an inferior kind. Still, so it is, and after all the great fault is with the architects, for the man who is building "as magnificently as possible" is perfectly willing to pay for the best and only wants to have it pointed out to him. Having once begun to speak of rock-face work, it would be manifestly unjust not to mention the most astonishing example of that style in Philadelphia — the still unfinished building at Fourth and Walnut Streets for the American Life Insurance Company. It is hopeless as well as quite unprofitable to criticise this abnormal structure with its boerling tower pulsed on a crooked column and its gigantic, meaningless stone mask gazing vacantly across the street but it is only right to call attention to the ingenious idea of the architect in making the window-grilles, although broad enough to interfere seriously with the light, of such unusual thinness as to increase the massive look of the building by contrast and at the same time to assure the public that its terrifying aspect is only a joke. Another of the new rock-face buildings — but much milder than the last — is the Union Trust Company's, on Chestnut Street, where it is to be regretted that the rough stone has not entire monopoly of the front, for wherever carvings and mouldings occur, whether in stone or galvanized-iron, they only accentuate the design, and the design is probably as flashy and as vulgar as anything that has yet been foisted upon the Philadelphia public.

In the appointment of Mr. James H. Windrim, architect to the Treasury, there is real cause for congratulation for the country in general and for the cities for which new Government buildings are to be designed, in particular. And it is very fortunate that Mr. Windrim, with a great deal of work in his office, should have consented to take the post. It would be superfluous to point out the immense amount of good that may be done by having a thoroughly competent man in this most exacting position; the Supervising Architect, in fact, has so much of the business part of architecture to go through with, that Mr. Windrim said the other day, half despairingly, that he did not see how he could do any designing, as his first few weeks in Washington had been entirely spent in signing his name!

In *Scribner's Magazine* for May, Mr. Charles Eliot Norton has a most thoughtful article in which he deplores the lack of old homes in America. There is much sad truth in what he says, but it must be that he does not know Pennsylvania, or even Philadelphia whose conservatism (although a by-word and a reproach among the more restless cities) surely has its advantages. "The American is a marvel" says Mr. Norton "who lives as an old man in the house in which he was born, who inherits and transmits hereditary acres . . . and who closes his eyes at the end of life on the same landscape which they beheld when they first opened." If we are to take this literally, marvels make a very large part of the population of Pennsylvania numerically and a still larger part if we count for anything their importance in the community. In order to give some idea of the immense difference between Philadelphia and other cities, we must quote again: "In Boston and New York, for example, scarcely a house remains that was a home at the beginning of the century, and of the few of this sort that may still exist very few, if any, are occupied by persons of the same social position, and hardly a single one by persons of the same family that dwelt in it fifty years ago." It must be acknowledged that this would apply in a modified form to the heart of Philadelphia for the crowding business blocks are giving the old private houses near the Delaware a hard struggle for existence, but on going some distance from the centre while keeping within the limits of the city we find dozens of old houses built before the Revolution (and some few that date from the seventeenth century) where none but descendants of the original owners have ever lived and where the family-name is as much a part of the house as the mortar between its stones.

Mr. Norton acknowledges that in the country it is easier to find a man living in the house that his father has built than it is in the city. This is probably more true of Pennsylvania than of any other State. Throughout Eastern Pennsylvania, at least, the old farm-houses are very rarely sold but are lived in as a matter-of-course by the same family generation after generation. I say Eastern Pennsylvania, because farther west the houses are mostly of wood and very transitory and uninteresting. Excepting within a radius of say thirty or forty miles of Philadelphia, the old farms are exactly as they used to be and the country has lost none of its distinctive character, but within the last very few years this charm has been appreciably lessened in the immediate environs of the city. Cheap wooden houses, things never dreamed of by the serious-minded settlers, are springing up on every side, utterly out of keeping with their surroundings. Not only do they ruin the landscape with their crude and glaring colors, but instead of nestling as the old ones do in sheltered places in a valley, these modern abominations show their sharp cardboard angles outlined uncompromisingly against the sky.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF FREDERIC FRELINGHUYSEN, ESQ., LENOX, MASS. MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC SPIRES AND TOWERS, PLATE 44.—ST. NICHOLAS, NEWCASTLE-UPON-TYNE.

[Issued only with the Imperial Edition.]

THE AGE OF FRANCIS I, PLATES 6 AND 7.—COURT-YARD, BLOIS.—PULPIT IN THE CHURCH AT FONTAINEBLEAU.

[Issued only with the Imperial Edition.]

HOUSE OF MR. J. FRANK COLLOM, MINNEAPOLIS, MINN. MESSRS. C. W. & F. D. ORFF, ARCHITECTS, MINNEAPOLIS, MINN.

THE body of the work is to be of pink Kasota stone and laid in broken range with portions of it laid in cobble stone, and crimmed in Pennsylvania serpentine stone for all of the dressed and carved work. The work is being performed by the day and will cost from $60,000 to $75,000.

AUCHMUTY BUILDING OWNED BY THE BOSTON REAL ESTATE TRUST, BOSTON, MASS. MESSRS. WINSLOW & WETHERELL, ARCHITECTS, BOSTON, MASS.

FIREPLACE DESIGNED BY MR. J. W. BLISS.

HOUSE FOR V. E. WHITMORE, ESQ., ROCHESTER, N. Y. MR. OTTO BLOCK, ARCHITECT, ROCHESTER, N. Y.

HOUSE FOR J. M. DAVIS, ESQ., ROCHESTER, N. Y. MR. OTTO BLOCK, ARCHITECT, ROCHESTER, N. Y.

BOSTON

THE COURT-HOUSE.—THE STATE-HOUSE ALTERATIONS.—HARVARD COLLEGE BUILDINGS.—OTHER BUILDINGS IN CAMBRIDGE.

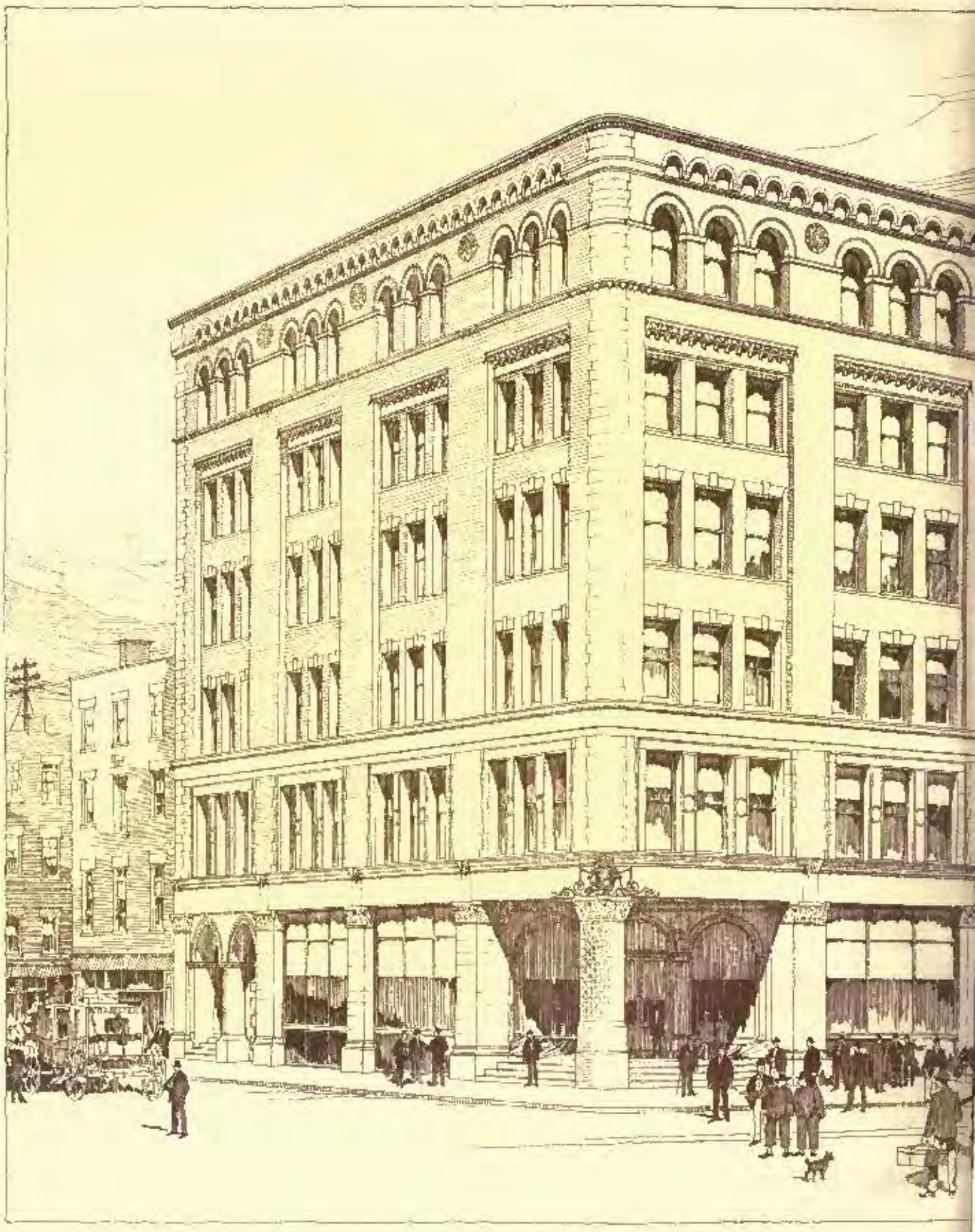
DURING the last few months there has been but little progress in much of the building in the city. The Court-house has gone on steadily, and the façades are practically completed. The Pemberton Square front reiterates the fact that a simple repeated motive, if on a large scale, is always impressive from its size, and is dignified in spite of ordinary detail. The great arcade is certainly a thing for which to be very thankful, a thankfulness that is tempered somewhat when the mouldings are considered. Its virtues are great ones—the virtues that are seen in the aqueducts of the Campagna and of Segovia; but it will be at its best by moonlight, when all the smaller parts are fused in the mass. The clock is as much a mistake as ever. A clock-face is, in point-of-fact, merely a dial over which two hands travel, and requires only a straightforward frame about it, round or square as may be, and possibly enriched. Yet, the popular impression seems to be that this dial is a climax, a thing worthy of pedestals, of pediments and heraldic supporters, until it becomes a very apotheosis of time. The halo very seldom fits thoroughly well.

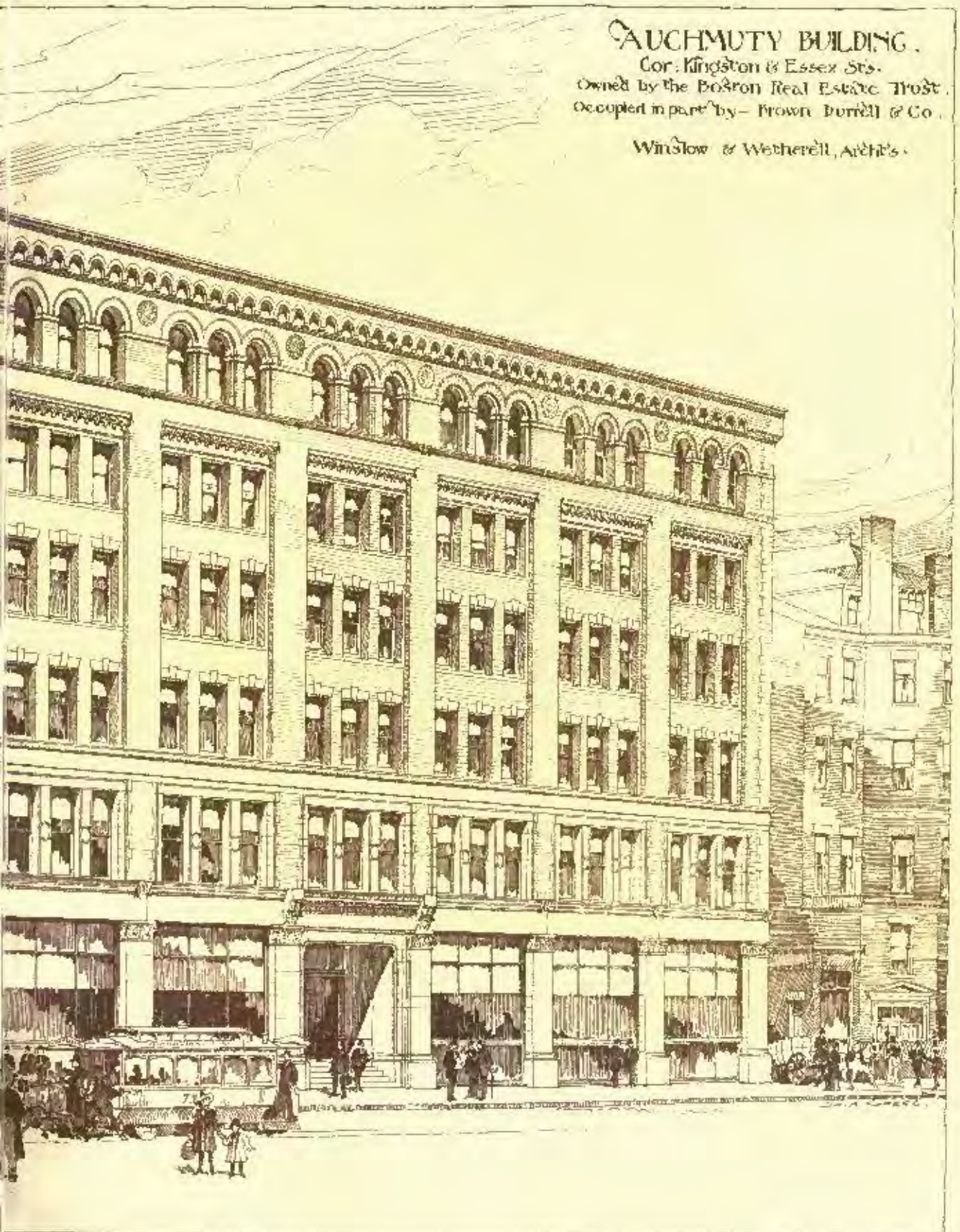
The smoke has begun to clear from the State-house competition skirmish, and the result is seen to be better than there was cause to expect. Now that matters have regulated themselves, the question can be referred to without creating further unpleasantness. The protest of the architects against the terms of competition was taken expressly for the purpose of destroying the effect of such terms as a precedent. The Governor objected and reiterated his objection at the dinner of the Master-Builders, that the architects asked him to do what the law, as it stood, did not allow him to do. This was perfectly well-known at the time of the protest, and the Governor was neither misunderstood nor in any way injured by the protest. There was neither time nor power to amend the previous legislation, but there were both to protest against the result of it. At a time when the public taste had reached the point where it takes an interest in architecture without knowing the rudiments of its science, when it mistakes the prettiness of a perspective sketch from one point of view for the character of a monumental building—which is to be walked through, and not seen through the small end of a field-glass—there was instituted a competition which, by its terms, would attract all the specious cleverness in the profession, while it would repel, at least, a good part of the men of restraint and of studious qualities. It was time to make a protest.

The old cry arose that undeveloped talent might appear. Of all studies, architecture is the most gradual in its growth towards achievement. A poet may be born, but an architect must also be made; and the belief that a monumental building can be designed by a stroke of genius and without previous training, is a faith in a fortuitous convolution of forces that is scarcely sane. The fact that three of the protestants were asked to award the prizes, either indicated especial confidence in the quality of the protestants or—a sop to Cerberus. The design as revised and published in the daily press is quiet, follows the key set by the old building and is well-planned. The colonnades come in the right places, the arcades over Mt. Vernon Street give an excellent opportunity for a treatment that is so well-handled in the Genoese palaces and in the Louvre. The pediment seems flat and unnecessary. A pediment of such a size is a very awkward thing to deal with, unless it is filled with sculpture, a thing that it would be as well to be chary in doing, as it has rarely been done respectably well since the time of the Greeks. It is, of course, impossible to judge the detail, but it can easily be an improvement over that of the present State-house, of which it is its weakest point.

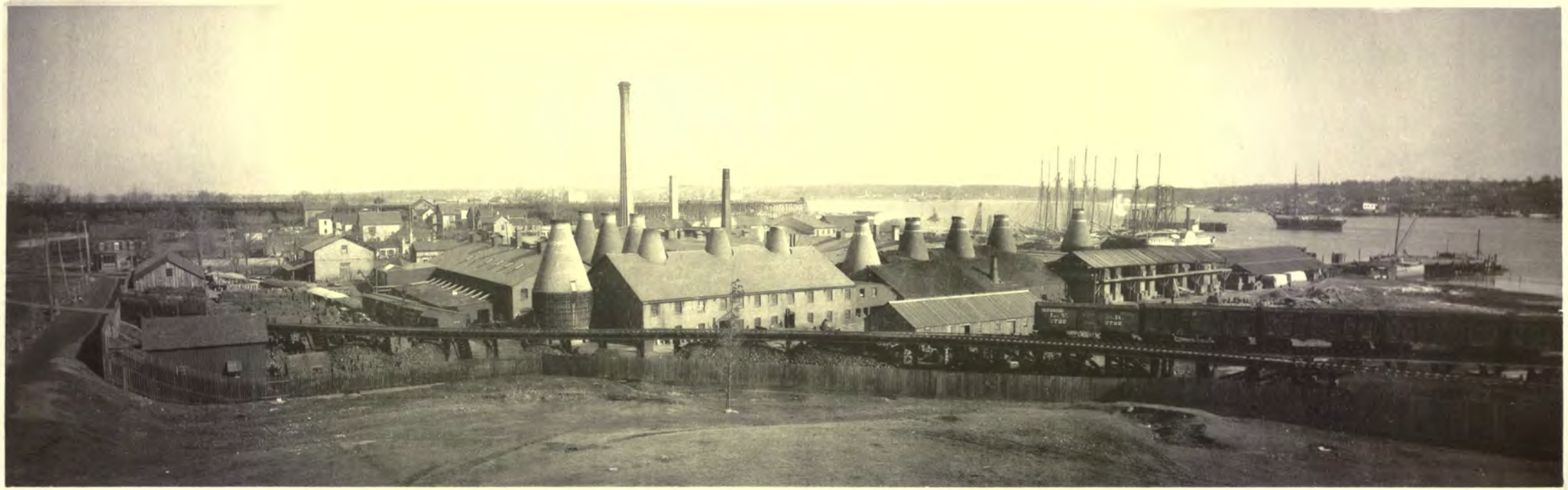
In Cambridge there are several new buildings approaching completion, of which the best is Hastings Hall, the gables of which are especially well-handled. It is our chief hope, so far as architectural effect is concerned, that each building erected is a unit sufficient to itself, and is unconnected by cloister, arcade, wall or roof with anything else. As a result, Harvard is devoid of interest as a whole, and excites varying sensations as to parts. There is no unity of idea, method or even a continuity of masses; each building is alone and lonely, and the whole impression is one of a lot of scattered fragments, of all sizes and shapes. This would be well enough for a country academy, but should not influence the disposition of the buildings of a University; and it is much to be hoped that at some time the buildings of Harvard may be connected and made into some sort of a heterogeneous whole. What is true of Harvard, is true of all our towns, excessive, isolated individuality—a kind of individuality that is insolently original. There is an example in the two new buildings near Felton Hall—the Industrial School and the Library: two more different buildings it would be difficult to find, as to material, lines and masses. The School is the better, as it is simpler and more direct, and is, on the whole, a very good building. It has the motive which may be ticketed the citadel-gate motive, as an entrance with the two flanking tourelles, the central arch, etc. It is very correct—exact symmetry, contrast and concentration of interest upon the entrance; but, in some way, it seems a little affected, a little mediæval, and the portcullis seems to be lacking. The iron balcony on the central ventilating shaft, and the shaft itself, are, however, sufficiently modern. If slate is good enough for the roof, why not tiles be used on the bays or tourelles? This use of numerous materials is another American besetting sin. As for the Library, it is undoubtedly picturesque (imagine picturesqueness set in a treeless scrap of field, level as a pond), but it is the most aggressively sophisticated building in Cambridge. Its whole manner implies a consciousness of making a brave show—under the circumstances—and of educating the public as to what a combination of tower, pitched roof, arcades and dormers can be if it tries, and tries hard. The detail is, in some places, too coarse, in others, too fine, there is no sense of relation of parts. The dormer finials are well cut, but too finely cut; the same thing is true of the arch mouldings, and the two-storied caps are painful travesties upon old models.

One man in ten is born color-blind, and a color-blind person cannot tell the difference usually between green and red. It is charitable to suppose that the person who selected the stone for the building on Main Street, Cambridge, corner of ——— Street, has the misfortune to be color-blind; nothing else will excuse the use of a green stone of the color and texture of green soap. Apart from this, there can hardly be found a building with fewer claims to respect; it is a mixture of split-face stone, used in too small and too square pieces, of heavy arches, of which the voussoirs are so cut as to appear unconstructive, of copper bays of uncouth outline with unnecessary terminations, of ornament in the wrong places, and without vigor or method. It belongs to a class of building that usually I would pass by without a word, but, in this case, from its manifest cost and from its pretentiousness, it occupies the position of a thing that vitiates the public taste, and needs mentioning, so far as design is concerned, in the same way that the Cogswell fountain needed mentioning. It may in spite of this, however, be a convenient and agreeable building in the interior, and a very good investment.




AUCHMUTY BUILDING.
Cor: Kingston & Essex Sts.
Owned by the Boston Real Estate Trust.
Occupied in part by- Brown Durrell & Co.
Winslow & Wetherell, Arch'ts.

Tolman Printing Co. Boston

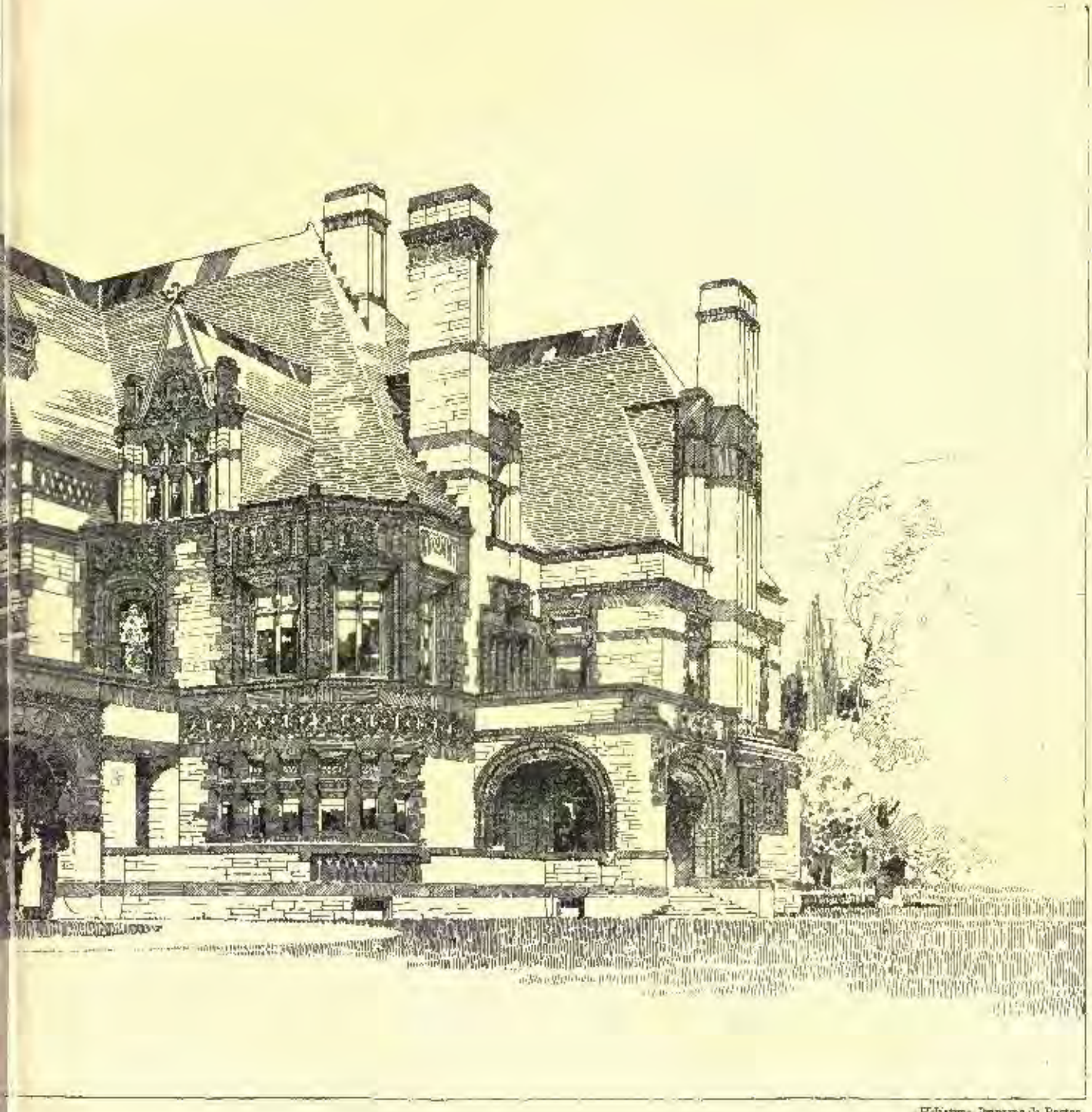


ADVERTISING PAGE.

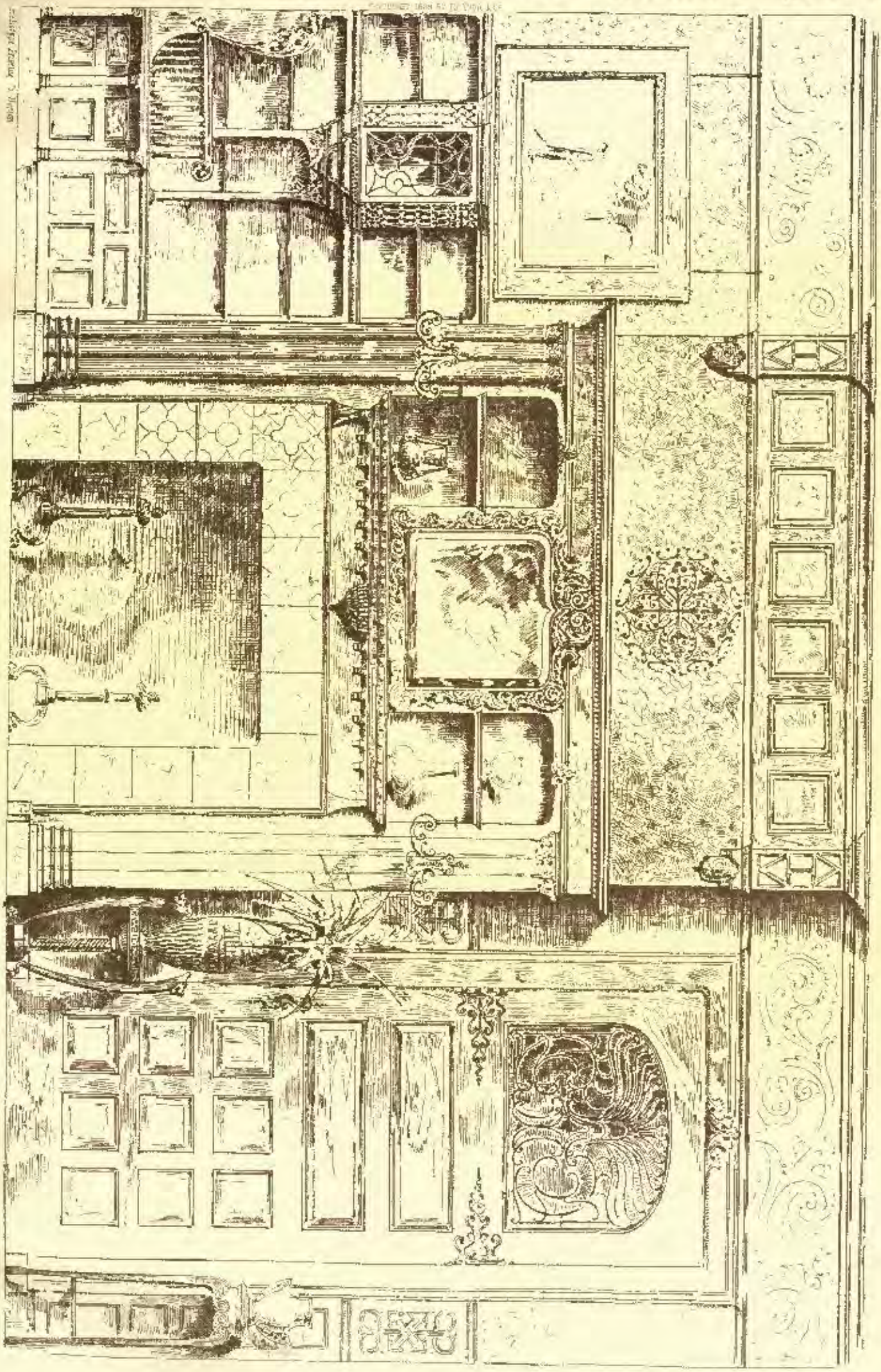
VIEW OF THE WORKS OF THE PERTH AMBOY TERRA COTTA CO.,
PERTH AMBOY, N. J.

HELIOTYPE PRINTING CO., BOSTON.

RESIDENCE OF Mr J. FRANK COLLOM MINNEAPOLIS MINN.
G.W. & F.D. ORFF ARCHITECTS A.D. 1885.



Heliotype Printing Co. Boston.



A SUIT FOR EXTRA COMPENSATION. — THE PROPOSED CONSOLIDATION OF THE AMERICAN INSTITUTE OF ARCHITECTS AND WESTERN ASSOCIATION OF ARCHITECTS. — PROJECTED OFFICE-BUILDINGS. — EXHIBITIONS.

CONSIDERING that the city directory contains over two hundred names of individuals who are actively practising architecture in Chicago, it is quite remarkable that their names so rarely figure in the courts in connection with any proceedings to obtain their fees. Lately, however, quite an important suit[1] was brought in the Superior Court by one of our architects to obtain extra compensation for unusual and extraordinary services, which excited general interest among the profession here, several of the prominent architects appearing on the witness-stand. The facts of the case are as follows: The defendant sometime since when about to build his restaurant, which cost nearly $150,000.00, and is to-day the most elegant place of its kind in the city, made a written contract with his architect for the regular professional service at the rate of three per cent instead of five per cent. The desire was to have the building ready for occupancy upon a certain date, but in order to accomplish this it soon became evident that the greatest diligence would be necessary and in order that everything should be pushed along as rapidly as possible and that nothing might be delayed, the defendant desired his architect to devote his entire time to the building, promising him, but not in writing, additional compensation. Accordingly the architect gave his personal supervision to the work daily, the entire day, and as a consequence the building was occupied at the desired time. When, however, it came to a settlement between the architect and his client, disputes arose and finally the case was brought into court.

The architect filed the following bill of particulars.

3 per cent on $146,571.00 as per original agreement,	$4,397.13
Special supervision daily, all day, 2 per cent,	2,931.42
Total,	$7,328.55
By cash at divers times,	3,000.00
Balance due (or sum for which suit was brought),	$4,328.55

The defendant admitted that $685.70 was still due to the architect and upon this basis the case was argued. Both parties waived the jury, and the case was submitted to the court, so that the result is unusually interesting, as no one can say that fine rhetoric had influence on an ignorant jury.

The defendant submitted to the court: First, that the services rendered were simply the services contracted for in the original written agreement. Second, that the contract alone should govern and that a promise to pay further compensation was a promise without consideration and therefore void and not enforcible.

On the other hand the plaintiff submitted that the regular professional services he had contracted for, did not include any such extraordinary labor as he had rendered at the special request of the defendant, and that such services were extraordinary and extra according to all rules of architectural practice, and in confirmation of this, some of the prominent architects of the city went upon the witness-stand. The court found that under the contract if it was necessary that plaintiff should devote his entire time to superintending the building he was bound to do so, but the court further found that the plaintiff at the request of his client, devoted a much greater portion of his time to the business and interests of the defendant in the matter of the construction of the building than was necessary to properly superintend the construction of the same and much greater than is customary among architects in this community under like circumstances. As a result, judgment was given in favor of the architect for $2,180.00 and the case has not been appealed.

An unusual amount of interest is felt here in the balloting now in progress for and against the consolidation of the Western Association with the American Institute of Architects, and the feeling so far as can be judged seems to be practically unanimous in favor of such consolidation. Should the measure be defeated either by the extreme East or the extreme West, there will be much disappointment, for the feeling at this point is of the most cordial possible character between the two bodies, of both of which, indeed, many are members, and this good fellowship has been strengthened by several recent events, notably the invitation from the Illinois State Association to the Chicago Chapter of the Institute to be present at their last regular monthly meeting and luncheon, and afterwards to accompany them through one of the large office-buildings that is just on the point of completion. There are several of these buildings that are particularly worthy of note but as yet, although supposed to be ready for occupancy, they are scarcely so and cannot be seen at their best, until the workmen are out of the way. Although these large structures are not yet filled with tenants, the projects for extremely heavy buildings seem to continue and should the sketches now on the boards be carried out some of our large buildings, now the largest of their kind in the world, will in their turn be eclipsed by mammoth constructions.

The curious scheme of bringing the old, historic Libby Prison to Chicago in sections and rebuilding it here, as mentioned in a previous letter, is now being accomplished.[2] A large piece of property has been leased for ninety-nine years and a high, picturesque stone-wall with tower and battlements is being built across the front so as to completely hide from public sight the old prison itself until one is inside the inclosure. The prison building, it is understood, is now being taken down at Richmond preparatory to shipping it to its new resting place, where it will serve the purpose of a war museum.

Art exhibitions continue to be numerous and well attended. The Palette Club (formerly the Bohemian Club) an association of ladies both professional and amateur, and the most important of its kind in the city, has had its annual exhibition where many good things were shown, some of the charcoal-work being very far above the general average of work of that kind in this country. Some of the water-colors were also very successful, while a case of miniatures attracted unusual attention. The annual Water-Color Exhibition at the Art Institute is now in full blast and many very excellent things are shown. Quite a number of this exhibit had already been hung at New York earlier in the season. The Chicago Artists' Club in a few days will open their exhibit in black-and-white from which their friends are anticipating much pleasure.

[1] Francis L. Charnley *vs.* Herbert M. Kinsley.

COMPETITIONS. — NEW OFFICE-BUILDINGS. — THE ROYAL VICTORIA HOSPITAL. — THE PARLIAMENT BUILDING AT TORONTO. — PROPOSED BRIDGE AT QUEBEC. — THE ST. CLAIR TUNNEL. — UNDERGROUND WIRES.

THE Ontario Association of Architects, recently incorporated, is showing signs of activity. As a first official action, it is setting itself against improperly-conducted architectural competitions. There is a very strong feeling against competitions generally, and many look forward with hope to the time when the public will have learned that it is serving its own interests best when it goes direct to any architect it may feel confidence in and give him the work it wishes to have carried out, without resorting to public competition. Of course, the idea of the public is that through a competition more can be got for the money; the most, in fact, that money could be possibly made to produce; so much, indeed, that it is doubtful whether under any other circumstances money could be made to go so far. And as the public holds out what it thinks is a tempting bait, it winks and puts its finger to the side of its nose as it contemplates the interesting spectacle of hungry architects, like so many minnows, struggling to get hold of it. But the end of this kind of thing is at hand, and woe to the committee who, in the Province of Ontario, offers such an insult to the profession. Think of the village building committee we suggested a few months past as a suitable subject for Dickens's pen, and imagine the change of expression on the placid and well-satisfied wardens' countenances when the thunderbolt from the Ontario Association of Architects descends in their midst, taking them suddenly aback, and informing them that their proposed competition must be very differently conducted if they wish architects of standing to enter into it. The Secretary has recently sent a circular to the members of the Association, advising them not to enter into a competition just advertised, and requesting all architects who know of any contemplated competitions to communicate with him, that, if necessary, he may take such action as may lead, if possible, to the fair management of the competition. Such energetic action is very praiseworthy, and, it is to be hoped, will be well persisted in.

The Confederation Life Association in Toronto intends to erect a great block of offices soon, and will probably throw the work open to competition before long. I believe the preliminaries of the competition have been under discussion, and that professional advice has been obtained on the manner of its conduct. They will probably spend some $400,000.

The Equitable Life Association of Toronto and the Young Men's Christian Association of Montreal intend also to erect large blocks of offices this year. The Young Men's Christian Association, with praiseworthy and Christian humility, intend to surpass all other

[2] The providential wrecking, near Maysville, Ky., of the freight train upon which was loaded the disjoined fragments of this notorious building will, we hope, put an end to this most un-American enterprise. We fear, however, that the number of relic-hunters in that neighborhood was not large enough to cause the total disappearance of the material. In case the enterprise is carried on it would not be an unrighteous act for the press to ensure its failure by alleging that the wreck caused the total loss of the original material and that the managers were offering the public a sham and fraud. An exploded fraud is not a paying property. — EDS. AMERICAN ARCHITECT.

similar associations in the splendor of their new building and the perfection of its arrangements.

Mr. Saxon Snell has appointed Mr. J. R. Rhind, an architect of considerable ability in Montreal, to be superintending architect under him for the new Royal Victoria Hospital. Mr. Rhind will prepare an estimate of the cost, Mr. Snell being, naturally, unacquainted with the details of prices of material and labor in Canada. The work will be put to tender as soon as possible, and commenced with as little delay as possible. The Hospital is to be the most perfect ever erected, and architects and students will do well to make a study of it as the work proceeds.

The plans of the Parliament Building, already half executed, have been entirely rearranged and the front elevation completely altered, and the design already published, and which caused the outcry against the building, withdrawn. Several hundred thousand dollars have already been spent. At the present moment the works are at a standstill, owing to the sudden decease of the contractor, Mr. Lionel Yorke, for many years a prominent builder in Toronto. Mr. Yorke was a much-respected citizen and a worthy contractor, having one of the largest businesses in the city. He was taken suddenly ill, and died after a few hours on April 13. The Ontario Association of Architects and the Architectural Guild of Toronto sent deputations to the funeral.

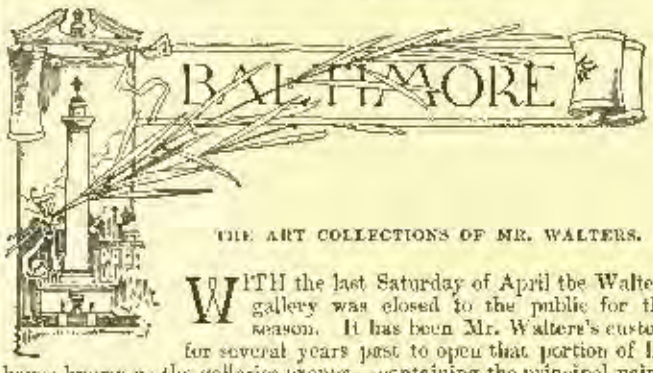
The plans for the Board of Trade Building have been tendered on during the last few weeks. The tenders are all in by this time, unless the allotted time has been extended, so we may soon hear what it is to cost. The general idea seems to be that it will foot up to nearly $300,000.

The Toronto Court-house site is still vacant, and the building, therefore, not yet begun. The corporation have not quite enough money yet to warrant their making a start, and they will submit a by-law soon to the rate-payers to ascertain their opinion upon the raising of $500,000 in addition to the sum already subscribed. Justices and grand juries are continually remarking that it is about time we had a new court-house, but it must be remembered that Rome was not built in a day.

The old city of Quebec is usually very quiet, and goes on placidly with its building operations without attracting much attention. But some people of an engineering turn of mind there have suddenly waked up. They have a scheme of colossal proportions in view, and one which one would imagine took some of its dimensions, at least, from the dream from which they had awakened. A deputation of sixty gentlemen recently arrived at Ottawa to interview the Government on the subject of a proposed bridge, of cantilever principle, to be constructed across the St. Lawrence, six miles above Quebec. The request of the deputation was for a subsidy of two million dollars, or interest amounting to one hundred and twenty thousand dollars a year, for twenty years, for the purposes of the bridge. It is difficult to see what advantages would be gained by such a bridge: the ordinary traffic is amply supplied by the ferry-boats nearer the city, and the railway companies have sufficient means of crossing the river at Montreal and Lachine. The Government promised to give the subject due consideration, but did not hold out any particular hope of success for the scheme.

The great tunnel of St. Clair, the object of which is to connect the Grand Trunk Railway systems at Sarnia and Port Huron, has been begun. The present connection is maintained by ferries which transfer the trains from Point Edward, in Canada, to Port Gratiot, in Michigan. The proposed tunnel will be about three miles south of the present ferry. The total length of the tunnel will be 6,800 feet, of which 2,910 feet will be under the river, 1,160 feet under dry ground on the Canadian side, and 2,330 under dry ground on the American side; about 1,500 feet in the part under the river will be level, and from either end of this length there will be an upward grade of one in fifty, which will be continued through the cuttings forming the approaches on either side. On the Canadian side the length of the ascent will be 4,970 feet, and on the American side, 4,900 feet. The depth of the lowest part of the tunnel, below the surface of the water, will be 88 feet 6 inches, and the minimum depth from the bed of the river to the top of the tunnel will be 15 feet. The tunnel-casing will be of iron, with an internal diameter of 20 feet, and it will contain a single track. The company carrying out the work is an independent company, and not the Grand Trunk Railway Company, and the work is being executed without contractors. The total cost is estimated at $2,500,000, towards which a subsidy will be granted by the Dominion Government of $375,000. The works are to be completed within two years.

As the result of a tour of Toronto Corporation officials through such cities of the United States as have their telegraph, telephone and other wires placed underground, Toronto is seeking legislation to make the various electric companies in that place take down their wires from on high and put them in channels underground. A curious difficulty arose and caused several months delay through the inability of the City Solicitor to find which Parliament, the Provincial or Dominion, had power to legislate in the matter. As it proves he was in the right when he suggested application being made to the Ontario Provincial Parliament. But this Government thought that as the companies had received their charters from the Dominion Government, it was necessary to apply to Ottawa for the required power. A bill was consequently introduced into the Dominion Parliament this session, but it was thrown out, because it was proved to be a Provincial matter, and the matter must be held over until the next session of the Ontario Parliament, before anything can be done. I do not suppose the overhead wires in Toronto are more unsightly than they are in any other prosperous city of equal proportions, but they are certainly bad enough. Hamilton is certainly a smaller place, but, perhaps, its wires are more disfiguring, because all the tough old posts those stuck up in the streets of that little place used to be the very toughest. It is some time since I happened to be in Hamilton, so, perhaps, they have improved in these matters. But you might count at least two broken-kneed or weak-backed telegraph-poles there, to every one that was at all of a decent shape. I recently saw an account of a trip to Canada, published in England by some Englishman, and the two things which appear to have struck him most in Toronto were Jarvis Street, which the author saw in midsummer, and speaks of as one of the most beautiful streets in the civilized world; and the quantity of overhead wires. Jarvis Street is certainly very pretty, with its avenue of shade-trees, grassy "boulevards" and detached houses in their gardens; but it hardly comes up to Sherbrooke Street, Montreal, which is much wider, and with an avenue of much older and larger trees; and when one looks round the "civilized world" certainly the boulevards of Brussells and Paris and other Continental cities surpass it by a long way. But of its kind, Jarvis Street is a good example. It will soon be paved with Val-de-Travers asphalt, which will make it a particularly choice drive.



THE ART COLLECTIONS OF MR. WALTERS.

WITH the last Saturday of April the Walters gallery was closed to the public for the season. It has been Mr. Walters's custom for several years past to open that portion of his house known as the galleries proper — containing the principal paintings, and the Oriental bronzes and ceramics — during the months of February, March and April, for one or two days in each week, from eleven to four o'clock, for which tickets are sold at fifty cents apiece, up to a limited number for each day, and the proceeds handed over to the "Poor Association" of the city. On certain other days in the same months the galleries, and sometimes the whole house, are opened on the same conditions to schools, art-classes, artists, etc.; and again, by special invitation, Mr. Walters occasionally meets a number of artists and amateurs, or some distinguished strangers in the city, and, as a genial host as well as a connoisseur, will himself show and discuss with them his treasures. From May to February again the house remains jealously closed to the public, and it is only a visitor having some exceptional claim who is admitted within its doors during that time. It is stated that about six thousand persons visited the gallery by ticket during the season just over, covering in all about twenty days.

The question is not infrequently asked by those who have not seen it, "What *is* the Walters gallery?" A great many scattered accounts have been written about it from time to time, and have appeared in various newspapers; descriptions of the pictures alone, or of the ceramics or the bronzes; reports of artists' receptions given at the house; eulogistic rhapsodies, superlatively burdened with lady-like adjectives, from the pen of some enthusiastic visitor from another city, but none of these seem to have accomplished the result of giving a comprehensive general description of the place.

It is not a public building, a mere art museum or a picture-gallery, originally designed for that purpose, in any sense of the word. It is simply a dwelling-house, rather above the average size, and expensively constructed and decorated for its day, now somewhat uninteresting in itself, and not meritoriously "old-fashioned," which has, by a very gradual process, and with a fairly successful result, grown to be the receptacle for one of the most valuable and most interesting collections of art-objects, for its size, now existing, in America certainly, if not in the world. The building stands on the south side of Mt. Vernon Place, in the middle of the block, and has a three-storied façade, not over thirty feet wide, of brick painted gray, with some little white marble about it, and a small Corinthian entrance portico, where, in the centre of the ceiling, hangs a rather curiously-shaped little lamp, said to be always burning. The interior arrangement of the house is the somewhat stereotyped plan of that day — the "three-rooms-deep" — with a hall some eight feet wide, on one side, containing the stairway, the middle room being rather imperfectly lighted by an open space near the centre of the building, and this same general arrangement is maintained through the three principal stories. Gradually almost the entire house has, bit by bit, been abandoned as a home, and has become an art-depository, only one or two of the less important rooms being reserved for domestic purposes; but the familiar and unchanged arrangement of the plan causes a strong suggestion of the dwelling

still to cling about it, which rather adds to than detracts from its interest as one strolls leisurely through the rooms.

A number of years ago an addition was made at the rear in the form of a one-story building, with interior dimensions of about 65 by 20 feet, lighted from the ceiling, and covering the entire remaining space of the lot, its end wall abutting upon the narrow street that bounded it on that side. This was the first picture-gallery; but the various accumulations that were continually being gathered and rearranged and systematized began ere long to cry out again for more room to show themselves, and heroic measures had to be adopted to accomplish the purpose. Across the narrow street on the rear was a building and lot fronting on Washington Place, and whose long axis ran at right angles to that of Mr. Walters's house. This property was acquired, and while a portion of it was left for other purposes, upon that part immediately opposite the existing gallery was built a new and larger one, about 75 by 25 feet on the interior, approximately fireproof, and lighted from the ceiling. The city authorities' permission was obtained to connect the two by an enclosed bridge, forming in itself a little "annex" gallery across the narrow street, which was far below the level of the gallery-floor, and the thing was accomplished. A very general re-arrangement of the pictures and of the entire collection was then undertaken, a catalogue of the pictures was published in a very convenient and attractive book-form, the present arrangement for opening the house to the public was established, and the Walters gallery stood complete as we find it to-day.

As we now turn to the collections themselves, we will not attempt, in the scope of such an article as this, to play the rôle of either professional or amateur art-critic, or of the intelligent reporter, duly primed with dimensions and money values, and various items of historic, legendary and romantic interest said to be attached to many special objects and pictures. The collection is far too large and too varied for that, for we are going to see not only a gallery of some two hundred and fifty oil-paintings, but also numerous water-colors, and an exceptionally rare and beautiful array of ceramics, bronzes, lacquers, jade, silverware, fabric-stuffs and bits of furniture, etc., etc., and we only propose to describe what the general distribution of all these things are, and the general impression produced as one wanders leisurely through the rooms, unattended by custodians, not even provided with guide-books or catalogues (except for the pictures), and seldom annoyed by the crowd of uninformed sight-seers common to most art museums.

We will choose one of the special days when the whole house is thrown open, and passing through the entrance-vestibule, rather elaborately ornamented with bronze panels set into carved light wood wainscoting, a tiled floor and frescoed ceiling — the whole producing an effect of rich decoration and good coloring, we present our ticket to the well-known, dignified and polite negro footman guarding the door, who receives it rather as if it were our visiting-card, and ushers us in with something of the courtesy extended to a favored guest, rather than as a mere atom of the six thousand "public," to all of whom he must do the same thing. We may leave our cane or umbrella with him, and purchase one of the picture-catalogues lying on the table by him, but neither action is either obligatory or even urged on his part. We find ourselves in the rather dimly-lighted hall, hung with Deck plaques and some good Chinese or Japanese panels, where stands also Rinehart's original marble, "The Woman of Samaria." The wall decoration of the hall itself, as well as of the parlors and throughout the house (except in the newly-designed galleries or special rooms) was not done at a time when such work was at its best — in fact, has little in it to attract special attention now — and, while not discordantly bad, does not call for further comment. We turn first into the parlors, on the left of the hall, the two rooms thrown into one long one divided by columns. They are crowded with furniture and bric-a-brac of every description, suggesting a combination of drawing-room and art-emporium — tables, chairs, cabinets, pedestals, brackets, bronzes and shelves loaded with small *objets de virtu* of many kinds — all interesting and beautiful and of intrinsic value. The only systematized classification apparent is an intentional and consistent abandoning for these rooms of any other classification than a varied collection of reproductions and smaller art-objects of many kinds and countries, more or less modern. On the mantel are bronze copies of Michael Angelo's Medici groups; in a glass case is a quantity of silver-ware, vases, pots, caskets and bowls of Turkish, French, English and American make. On a long row of narrow shelves is a collection of Vienna cups and saucers and some Venetian glass, while scattered about the room are "Sulou" vases, some marble busts and family portraits. But, somewhat oppressed with the mass of small things we have first lighted upon, and the consciousness of all the greater ones that lie before us, we hurry from the parlors and give a hasty glance back into the dining-room, feeling a little as if we were intruding, and that we might unexpectedly come upon our host and have to apologize for our presence. This, however, never happens. In the dining-room, only two things particularly interest us: the frieze running entirely round the room, painted a number of years ago by a French artist on canvas panels, and representing the game-birds of the Chesapeake, treated naturalistically in a landscape of the shallow waters and low shores of the bay as a background; and there is also a superb Sèvres vase on a revolving pedestal, treated with the typical landscape decoration. Before we give ourselves up to the galleries themselves, on whose threshold we now find ourselves — the *pièce de resistance* of the whole house — we will first see what there is up-stairs. The small room over the hall we find entirely devoted to a collection of small water-colors by Bonvin, marvels of minute detail and bright color, a sort of Meissonier treatment of still-life, flowers, fruits, and here and there a bit of a landscape or interior. Now we turn into the front room over the parlor, and hold our breath for a moment at the mass of gorgeous colors that lie before us. The entire room is spread with pieces, large and small, of Oriental fabrics in silk and satin, gold and silver, *portières*, scarfs, cushion-covers hanging over the walls and upon every article of furniture, most carefully and effectively distributed, all to be as carefully folded and laid away when the hours of inspection are over. The room directly in the rear of this is closed, but we pass back to that above the dining-room. This is one of the most interesting and valuable portions of the house, probably the only room of its kind in the world. It is entirely devoted to a collection of Barye bronzes, massed together on tables and in cabinets specially designed for the purpose, from the little paper-weight of a coiled serpent or miniature dancing bear to the large, allegorical river figures and the marvellously complicated groups, such as the tiger-hunt and others, with lion and horse studies in every imaginable attitude, fascinating in their suggestion of nature and life and in their power of reserve and selection.

On the third floor are two small rooms only to be seen. One is called the "Marie Antoinette" chamber, a little room furnished with various small pieces of the classically refined furniture of the Louis Seize period, some of it claiming to be genuine, others only reproductions, all pretty and interesting, and the walls and bed hung with blue and white and gold satin damask and white muslin. The other small apartment is usually called the "Dutch room," furnished with some old and odd pieces not corresponding in date, style or locality: a bedstead, a cabinet, a wardrobe, a mirror, some old blue-and-white china, etc., each interesting in itself, but rather a conglomeration as a whole. We may now finally retrace our steps down-stairs to the gallery, passing various etchings and engravings of more or less interest on the walls, and in the upper hall a table holding an album in which have been gathered a number of sketches representing the ideas of different modern artists on the subject of "prayer."

Reaching the first floor again, and passing down the long corridor by the side of the dining-room, we enter the first gallery. This was in former days where the pictures were hung, and the walls are still covered with a sort of drab-colored tapestry; but every available foot of space against the wall and over the floor that will not impede circulation is now occupied with the cases containing the ceramics, lacquers, ivories, glass, silver, jade and other objects of the best periods and rarest workmanship. The designs of the cases themselves, and the arranging and classifying and grouping of the objects with careful regard to form and color, show a most artistic hand, and add greatly to the impression produced. As we stand by one case filled only with the most valuable bits of old blue-and-white, we may look through the glass of another, containing only ivory and lacquers and kindred objects, to gorgeous masses of red and orange and green beyond. We tread softly over the old Eastern rugs that strew the painted wooden floor, and, finding ourselves in the farther corner, we pass through a little door into the water-color cabinet. It is very small, and closely hung with some sixty or seventy frames of moderate size and great variety of subject, but none that do not bear the name of an artist of high rank, some the very highest. These are Miller, Bida, Isabey, Détaille, Ziem, Fortuny, Meissonier, Rousseau, Tadema and Breton, all represented in this little box of a gallery. Our catalogue now comes into play, and, as we again pass through the ceramic gallery, we can only wish it would serve us some purpose here too; but it does not, and the task, indeed, seems almost hopeless to give names and numbers to the hundreds of objects massed in those cases. If, however, this could in some way be even approximately accomplished, the intelligent enjoyment of the gallery would be greatly enhanced for most people.

From the other far corner we pass under a little green velvet *portière* into the annex of the "bridge," where is concentrated the special attractions of the more delicate "peach-blow" vases and a large case of wonderful, small Japanese bronzes. Here hang three life-size portraits by Bonnat, — one, the best, of himself — forming a sort of introduction to the large gallery of the oil-paintings, the last and most important room of the house, to which the "bridge" is a vestibule giving access through an unobtrusive little green-*portièred* door in an extreme corner, which is almost lost to your notice as soon as you pass through it and you find yourself shut in by apparently four solid walls; this gives a peculiar feeling of seclusion, and almost of oppression, as otherwise the dimensions of the room are such as to produce the impression of a certain stateliness, as in a public gallery, and seem to demand more generous and evident entrances on the main axis. This, however, could not perhaps have been well avoided under the conditions of the alterations. These walls also are covered with a drab tapestry of a conventional dragon pattern; the heavily-coved ceiling leading up to the skylight, starting from a projecting cornice, is ribbed and panelled in very bold gold relief on a bronze background; a low wainscot in ebonized wooden panels surrounds the room below the pictures. The entire floor is covered with a heavy, rich, red carpet, and down the centre of the room are alternate couches of dark-green velvet and low, flat cases of lacquers.

We come now to the pictures themselves. Of no part of Mr.

Walters's collection has so much been seen, so much written, and so much known. As we stated, we do not propose to enter here upon the field of professional criticism. Perhaps it would be better if such things were only written by artists themselves, and read only by *connoisseurs*, if we could devise a means for a *connoisseur* becoming such without the aid of a criticism in the first place. It is stated that there are not to be seen here the pictures of the same startling interest, either from size, subject or brilliant treatment, as are found in some other private galleries of America, but it is also avowed that there is derived here from the whole collection a feeling of more general satisfaction, both to the artist and the amateur. As is well-known, the pictures are all modern. There are here the several familiar types to be found in all such collections: there are those of special merit and value from authorship or technical handling; there are those that most attract public interest from the subject chosen or from brilliant treatment; and then, among all the rest of more or less merit, there stand out conspicuously those particular ones — and they are not few — that we feel and know are the best, without having to give a special reason for the opinion, and that they are very great pictures indeed for these days. It is only one or two of these that we will mention.

Looking at each other from the two opposite places of honor at the ends of the gallery are Corot's "St. Sebastian" and Delaroche's "The Hemicycle," totally different from every point-of-view, but each equally worthy of its place; and, as we wander from one to the other, we irresistibly pause before Rousseau's landscape, "Winter Solitude," Tadema's "Sappho" and his "Roman Emperor," De Neuville's "Surprise at Dawn" and Breton's "Close of Day." Dagnan-Bouveret's "An Accident" and Gérôme's "After the Masquerade" we cannot omit, but we turn willingly from the feebleness of his "Christian Martyrs" to Baron Leys's strong and interesting canvas, "Edict of Charles V." Many others we want again and again to go back to and dwell upon, but the fading light warns us the hour for closing is near, and we feel that we have attempted to see too much at once, and in too short a time. To thoroughly enjoy and become familiar with all there is to see in this house, experience has taught us that our visits must be frequent and not too long if we would avoid intellectual as well as physical fatigue.

NEW YORK.

THE TIFFANY EXHIBIT FOR THE PARIS EXHIBITION. — THE DESIRABILITY OF EXHIBITIONS OF THE ART INDUSTRIES. — THE WASHINGTON SQUARE CENTENNIAL ARCH. — THE PROTESTANT CATHEDRAL COMPETITION.

ONE of the most interesting collections of modern industrial art work, which it has been my fortune to see, was the recent exhibition at Tiffany's of the jewelry and work in precious metals, they were about to send to the Paris Exhibition.

The jewelry, while remarkable in its way, was less interesting and showed less of the influence of modern methods on design and execution. The other pieces, however, ranging from card-cases and smelling-bottles to tea and coffee services, and even a complete toilet-set with pitcher and bowl, etc., in hammered silver, were designed with an appreciation of the qualities of the different materials, textures and colors, that made them fascinating studies to any artist, and particularly to architects. Not that they were in any sense architectural as the word is commonly used, but that the architect could not but see, in miniature, the same problems that confront him every day — how motives as old as the hills are revivified by new and personal interpretations, how closely interdependent are beauty and fitness, and how much effect lies in the true appreciation and the straightforwardness of the construction.

I have only referred generally to this collection realizing the futility of attempting any description of particular pieces. To one who has not seen them, nothing short of a very clever drawing at large scale could render their beauties in black-and-white, so delicately and justly have the different materials, textures and colors been combined and so good are the details. Some of your readers will be fortunate enough to see them in Paris, and others may on their being returned. It ought to be possible to have these and other notable achievements in the art industries, publicly exhibited, where they could be seen and studied. Paris has the Société des Beaux Arts appliqués aux Industries, which holds periodical exhibitions of the greatest interest, at which old works and new are exhibited side by side, or special industries, as tapestry or cabinet-making are shown in their chronological development, and it would seem, as if some such exhibitions might be initiated here under the impartial direction of some institution like the Metropolitan Museum, or better still through the coöperation of the kindred institutions of the principal cities of the country. The management being in capable hands, not only the producers of art industrial works, but private collectors of fine pieces, and all the artistic societies would have their sympathies enlisted and could be counted upon to contribute. Many treasures now practically inaccessible could be seen and studied by the already large and constantly-growing body of designers. The value of great permanent collections like those of the South Kensington Museum, is beyond dispute in forming the taste and developing the ability of the designers, and thereby influencing the perceptions of whole countries and adding to their well-being and prosperity. We have already several such permanent collections, barely outlined as yet, but increasing constantly in efficiency and scope.

The value of exhibitions of works of the same character brought together temporarily and embracing not only the old but also the latest productions in the different industries would have an equally beneficial influence and would not only *not* interfere with the usefulness and the resources of the permanent collections, but would, by bringing vividly before people the intimate relation between a knowledge of past work and the results of to-day's, greatly stimulate their interest in all such matters and practically demonstrate the advantage and utility of all permanent collections.

The Centenary Celebration has passed into history and has been treated, *ad nauseam*, by the daily papers, in every possible light and from every possible point-of-view.

We can record, in connection with it, one success scored by and for the profession, and none the less gratefully, that it seems to have developed in an entirely spontaneous and unpremeditated manner.

It seems that the residents on and near Washington Square, in casting about for some fitting method of expressing their patriotism and honoring the occasion, determined to erect a temporary arch across Fifth Avenue, at Washington Square, where the avenue begins, and being of intelligence above the average, they asked Mr. Stanford White to design their arch.

The houses on either side of Fifth Avenue and facing the Square

are very simple brick houses with white (wooden) cornices, etc., but large enough and quiet enough in design to have much of the charm and dignity of Colonial work, although built somewhere about forty years ago. Mr. White, taking advantage of these circumstances, designed a very simple wooden arch, painted white, with a few wreaths and ornaments in stucco, and surmounted by an old carved and gayly-painted wooden Washington, about eight feet tall. It was further effectively decorated with groups of flags and streamers of bunting and numerous incandescent lamps accented the main lines for night display.

A simple round arch spanning the street, resting upon panelled rectangular piers and crowned by a modillioned cornice and a balustrade was the motive, which would have been bare and cold but for a certain grace of proportion and an evident harmony with its surroundings. I think every one immediately concerned must have been a little surprised at the immediate popular success of this unpretentious wooden arch; it was, in a sense, the success of the celebration, and the suggestion was soon made, and as soon as made enthusiastically received by every one, to perpetuate the arch in marble, as a permanent record of the event.

At a committee meeting it was decided to raise by popular subscription, $100,000 for the arch and $50,000 for its adornment with sculpture. It was further agreed to entrust the designing of the permanent arch to Mr. White. In three days after the subscription

Sainte Nicholas, Newcastle upon Tyne.

Northumberland.

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Plate N.° 44.

was opened about $10,000 had been subscribed and the whole amount can without doubt be secured.

It will be most interesting to see what Mr. White will make of this exceptional opportunity. There are conditions, which make the problem by no means a simple one. The wooden arch spanned the roadway, the piers resting and encroaching upon the sidewalk, and in order not to block that passage entirely the piers had to be smaller than they should have been for the best appearance; carried out in stone they would hardly meet the requirements of stability and would certainly look thin and weak. The only way out of this dilemma would seem to be, either to encroach upon the adjoining property (the buildings setting back perhaps twenty-five feet from the building line), and the owners may not see the reasonableness of doing that, or to move the site to the lower side of the street in the park where there is plenty of room, thus changing radically the relations to the adjoining buildings.

The great Cathedral competition has reached another stage, it being announced that four of the designs have been chosen.

The lay committee, some weeks ago, selected three sets of plans, but not feeling absolute confidence in their own powers of discrimination they appointed a committee of two architects, Professors Ware and Babcock and one engineer, Mr. John Bogart, to make an independent choice from their stand-point. This committee reported on Friday the 10th, recommending four designs and it appears that the three previously selected by the lay committee were also included in their choice. This coincidence, which would seem to point to a distinguishing excellence on the part of the three designs, so far simplified matters that the decision of the committee was at once affirmed.

The author of one of these designs, one marked with three arabesques in a circle, is at present unknown to me. The other successful candidates are Messrs. Potter & Robertson, George Martin Huss, of New York and W. Halsey Wood of Newark.

The four successful competitors will be required to do some further studying of their designs, the exact nature of which has not yet transpired and it is expected that by Fall the final choice can be made. One member of the lay committee has suggested, according to the reporters, that models, at scale, of the designs might be required, a method of showing the merits of the different compositions that would certainly be most interesting and would offer, under proper restrictions, an excellent opportunity for comparison.

It has also been said, that it might have to be settled definitively what the exact character of the great Cathedral should be, and what provision should be required for the different functions, ceremonials, sermons, etc., upon which points it is understood that the designs submitted, range all the way from the English Gothic Cathedral plan, through the Basilica and the Classic to the type of St. Sophia with a great central space and hardly any transepts or apse.

There is every indication that the competition has been most fairly and impartially carried out and that the gentlemen sitting in judgment upon the sixty designs submitted, have spared no pains to arrive at the most judicious possible solution.

BOOKS AND PAPERS

LADY DILKE'S book[1] might have been better named. "*Art in the Modern State*," seems to imply rather a history of art or the culture of art in modern times, than an account of the foundation of the French Academy and the State patronage of art in modern France. The book is virtually a history of French art during the reign of Louis XIV, including the foundation of the Academy by Colbert and Le Brun. Lady Dilke has not only searched the National archives and those of the Institute, and read up all authorities upon the subject, but she gives her authorities in notes, and at the end of the volume reproduces some of the original documents. Perhaps the only fault which can be found in the book is a certain obscurity in the language here and there, and an occasional paragraph which is rather involved in its meaning.

The enumeration of some of the chapters will give the best idea of the contents: I. France under Richelieu; II. France under Colbert; III. The Royal Academy of Architecture; IV. The Royal Academy of Painting and Sculpture; V. The Academy Schools; VI. Le Brun and the Decorators of Versailles; VII. Puget, Girardon, Sarrazin and Guillain, Caffieri, Coysevox, etc.; VIII. Engraving; IX. Industrial Arts — The Gobelins and the Savonnerie.

The art movement by Colbert was assisted by Louis XIV's ignorant love of grandeur. When the King determined to build palaces for himself and his mistresses, regardless of cost to his subjects, who were made the paymasters, Colbert determined to profit thereby. Taking Le Brun as his leading artist, he brought into his service all the principal painters and sculptors of the day. Not only did Le Brun make designs for pictures and fountains, but he superintended all branches of the artistic work going on at Versailles, Marly and the Louvre, besides doing a great deal of the ceiling decoration himself. What remains in finished works and cartoons (and an immense deal has perished), proves him to have been an indefatigable and most industrious workman; and although they are often tainted by the sham *grandiose*, there is a certain amount of real magnificence in some of his designs. No one can walk down the Salle des Glaces, for instance, without feeling impressed with the grandeur of the general effect, and the beauty of the workmanship of much of the ornament. But the fault of it all is the mixture of the sham and the true, without, apparently, any reason; as for example, the magnificent marble staircase, with its wall decorated with false balustrades and admiring men in gorgeous drapery.

The teaching department of the Academy, seems to have been of gradual growth, and the Academicians were ever ready to shirk the work. Oddly enough, too, they were averse to exhibiting their works, and had to be forced to do so. It were well, were they (some of them) of the same opinion now. But if averse to exhibiting, they were ever ready to undertake other laborious duties, such as providing all requisites for their models in life and death. The model was attached to the Academy and received a fixed salary; consequently he was part and parcel of the institution; and we find a document in the archives which gives us an account of the cost of the funeral of one Jean François Deschamps, Academy model during the treasurership of Chardin, in 1773. The grand total amounts to 126 *livres*. On the other hand, a grand banquet held about the same time, only cost the Royal Academy 83 *livres*, although the prices of many of the viands were much the same as at the present time.

Lady Dilke pays a just tribute to France when she says that in the early days as now, she was at the head of the artistic culture and taste of Europe. Other countries have produced greater painters and sculptors; but taking art in a wide sense as regards fine art, so called, and artistic industries, France has always been the greatest educator, and has generally been the principal motive power; it has, in fact, been a good organizer and a school; where the talents of the individual have been (sometimes somewhat too much) lost in the service of the State and the general proficiency of its subjects.

[1] "*Art in the Modern State*," by Lady Dilke. Chapman & Hall, London.

SOCIETIES

THE DETROIT ARCHITECTURAL SKETCH CLUB.

THE Detroit Architectural Sketch Club, on May 9, 1889 — their second semi-annual meeting — elected the following officers for ensuing term: President, T. B. Laist; Vice-President, W. B. Stratton; Secretary, Clarence A. Fullerton; Treasurer, R. Mildner; Executive Council, Jean A. Hackett, Max Grylls, and J. B. Nettleton.

The club finds itself on a firm footing, and will banquet the architects of the city, on May 16th, the architects, by the way, have greatly assisted the club in getting through their first year, by various means.

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NOTES AND CLIPPINGS

A SUN-DIAL IN PARADISE. — Charles Lamb was possibly not far wrong, says *The Horological Journal*, when he conjectured that Adam had a sun-dial in Paradise. Dials are probably older even than alchemy. The Babylonians had them; though the Egyptians, that wondrous people who knew most of the things the moderns have rediscovered, seem not to have used them. The Babylonians gave them to the Greeks; the Greeks to the Romans; and the Emperor Trajan is credited with an epigram upon the art of dialing. Naturally dials are most frequent in lands where the sun shines as a matter-of-course and not as a rare complacence. French and Italian gardens are full of them; to the walls of sunny châteaux they are fixed in hundreds. In the old days, when there was time for sentiment and room for it, sun-dials were favorite gifts from great personages to one another — from people to princes, and from princes to people. Cosmo de' Medici, whose fitful humors so angered Benvenuto Cellini, gave one to the Florentine students of astronomy; and on the wall of Sta. Maria Novella it still marks the time of day. But even in our own cold land of fibre and complexion there are dials not a few. In Mrs. Gatty's book some 800 inscriptions are set down; and as some favorite legends are common to many dials, the recorded number is probably close upon 1,000.

AN ATTEMPT TO GET EVEN WITH A LANDLORD. — An instance of the immemorial feud between landlord and tenant, and one particularly noticeable because the latter was hoisted by his own petard, occurred recently in a fashionable up-town neighborhood. The tenant had been on unpleasant terms with his landlord for nearly a year, and took every occasion which presented itself to make himself particularly unpleasant. He held a five years' lease of the property, and this was to expire May 1. He sought to renew it, but the landlord

absolutely refused to consider such a proposition. Then the tenant went home to his wife and remarked: "My dear, we'll get square with that scoundrelly landlord." The plumbing in the house had been allowed to deteriorate, and the tenant concluded that it would be a great joke on the landlord to complain of this to the Board of Health, which, when it discovered the unsanitary condition of the place, would compel the landlord to improve it. So the complaint was entered and the sanitary inspector made his investigation, and declared the plumbing to be in an outrageous condition. The owner was notified of these facts by both Board of Health and the tenant. He paid no attention to either, except in addressing a polite note to the latter, calling his attention to the lease, in which the tenant had contracted, in consideration of a reduction in rent, to be responsible for all repairs which might be needed by the house until the expiration of the lease. The wholesale repairs required by the Board of Health spread consternation in the house. The family will not go to Europe this year, as was expected, but will spend the summer in some farmhouse, and the landlord is regarded by his associates as one whose success in life has made him a veritable leader among landlords. — *Exchange.*

The Freezing Process in Building. — The Chapin Mining Company, of Michigan, has recently made a very successful application of the freezing process of Dr. Poetsch, for the purpose of sinking a shaft through quicksand. The method of Dr. Poetsch consists in sinking a circle of pipes in the quicksand, and circulating in them a freezing-solution until the quicksand becomes hard enough to excavate. The shaft to be sunk in this case was 16 feet in diameter, and was to pass through two layers of quicksand to a depth of 101 feet, the nature of the ground having been previously determined by boring. A circle 29 feet in diameter was laid out, and twenty-six holes, 10 inches in diameter, were bored. Eight-inch wrought-iron pipes were then sunk in these holes, the pipes having their lower ends closed. In each eight-inch pipe a smaller pipe was inserted, reaching nearly to the bottom, and the upper ends of both systems were connected into the circulation of a freezing-machine. In this way it was possible to keep up a continuous circulation of cold solution through the pipes, which gradually absorbed heat from the ground and froze the quicksand until it could be worked without flowing. The shaft has been already sunk to a depth of over 70 feet, and the quicksand has been frozen as hard as rock, so that the work is carried on by blasting. The operations have been completely successful, and without the process the sinking of the shaft would have been an impossibility. — *The Architect.*

Effect of Different Woods on Metal. — The bearing of chemistry upon construction is thus illustrated by the *Lumber Trade Journal*: It is safe to say that no two varieties of wood possess the same essential chemical characteristics, and the instant one possessing much alkali is placed near another that gives acid in its reaction it will invite rapid dissolution and decay. What is true with reference to wood applies with all the force to the other materials used in structures. Two uprights, the mainstay of a quite large country bridge, rotted off at the ends when bolted together with an iron bolt. New ones were put in and fastened by wooden pins of the same variety, and ten years have elapsed and still they stand. In the first instance beech, which is known to contain much acetate, was used, and the iron soon oxidized, transmitting the rot to the wood, and though the rest was perfectly sound, the wood about the splice soon rotted off, while in the latter case the same wood from the same tree was used, but the wooden pins did not rust, and the joint remains firm and sound at this writing, and it is now nearly ten years since the renewal was made. Now if a wood like ash or oak, having less acetate in its composition, had been used, instead of rotting or oxidizing it would have tended to preserve the iron, hence would last longer than if fastened with pins made of its own species of wood, or any for that matter.

Coal Briquettes in France. — Among the new features that distinguish the surface works from those which one remembers a year or two ago, says Mr. André in *The Colliery Guardian*, the most prominent are the washing and screening machinery and the plant for the manufacture of briquettes. Great progress has been made in the former. The latter has grown into a very important industry, the beneficent influence of which is felt in the parent industry of coal mining. The "small" and the "smudge" now find a ready market. A few memoranda concerning this matter. At the Anzin collieries briquettes of various forms and sizes are produced. There are the five to eight kilogrammes (11 pounds to 17.6 pounds) blocks for the use of the Navy, turned out by Revollier presses; perforated blocks; and the ovoid bullets. The Fresnes-Midi Company manufacture perforated blocks, and solid blocks of five kilogrammes (11 pounds). The Nœux Company are making, with a Couffinhal machine, blocks of five to eight kilogrammes. The Carvin Company are producing small blocks of 1.5 kilogrammes (3.3 pounds), as well as the larger sizes. The Meurchin Company have directed their attention to the production of large blocks designed for the special use of torpedo boats. The Escarpelle Company are occupied in the manufacture of large rectangular blocks for the use of locomotive engines. At the Ostricourt Colliery there are very complete works, just erected, for the manufacture of blocks of all sizes from one kilogramme (2.2 pounds) upwards, except the largest used in the navy. At these works they make the ovoid bullets in four different sizes. These are sold mixed in definite proportions, the object in view being a more effective packing of the blocks in the furnace. The perforated blocks made here are rectangular, grooved on the face, and pierced with from six to nine holes. Their weight is 1.5 kilogrammes. They burn freely and regularly. Especially worthy of notice at Ostricourt is the system of mixing caking and non-caking "small." By means of revolving cylinders a perfect mingling of the two sorts in definite proportions is effected. This mixing of the two classes of coal constitutes a very important progress in coal preparation. Less than five years ago there was practically no market for non-caking small coal. Now it is in brisk demand at remunerative prices. The Eastern Railway Company were quick to perceive the economy resulting from the use of this mixture of the caking with the dry-burning sorts. At the present time they are using it in large quantities. One great advantage of the briquette industry lies in its utilization of dry-burning small coal.

TRADE SURVEY

Business is halting in nearly all directions, according to reports from creditable sources. Yet bank clearings indicate a greater volume of business than last year. Railroads are earning less, as a rule, though stricter economy does not allow the extent of the falling off to be seen. Bankers are lending as much capital, and mortgages are recorded with as great frequency as last year, but more are being paid off than last year, and the volume of mortgage indebtedness is on the wane. Within six years one hundred and seventy millions dollars of National bank currency has been withdrawn, and seventy millions will be paid off two years hence, making by that time in all, upwards of three hundred millions. The possibility of a financial stringency must be kept in sight, for the conditions are working around that way gradually. The examination of railway officials by a Senate Committee only intensifies the appreciation of the difficulties to be encountered before the questions involved can be disposed of. The week's business shows that trade is active. Permits for new work are flowing in; country work was perhaps never more abundant. Speculators and managers complain of narrow margins and lower profits, but certainly the common people are being benefited by the existing cheapness, and the *per capita* consumption is increasing. The widespread effect of the cheapening tendency in progress can be no more comprehensively taken in than by referring to such frequently published figures as the following. During the past twenty years the wholesale price on large lots of the following articles declined as here given: Sugar, 13c to 7 2-8c; Rio coffee, Japan tea, 46c to 18c; butter, 35c to 24c; cheese, 18c to 11c; wheat, $1.29 to $1.05; corn, $1 to 40c. Iron, steel, machinery, tools, equipments and a thousand other products have declined, and this decline has been attended in the great mass by an increase of consuming capacity. Despite this decline, agricultural and manufacturing interests have been prosperous. How long will this downward tendency continue? Until the natural requirements of our industrious populace are met, nothing is more natural than that the effects of this downward tendency should be averted, or the attempt, at least, made to do so, by syndicates and trusts and associations and combinations of all sorts. Given a certain set of acting and reacting forces, and the result is inevitable. Let the great economic facts and tendencies only be properly studied, and the appearance of these combinations will be readily and sufficiently accounted for. Without wandering into essay style, it may be roundly stated as a conclusion that these threatening influences cannot swing beyond a certain point in the arc. Latent social factors are ready to assert existence and force at the proper time to protect the best interests of society. The architects and builders have just as much work as they can conveniently handle. A few unimportant strikes evince that the chronic discontent of laborers cannot be altogether allayed. There is an urgent demand for new houses, a fact shown by recently published reports of the Land Department of Railroads. The generally oversold condition of tool, implement and equipment makers, especially west of the mountains, grows out of the heavy demand from agricultural sections, from machinery builders and house and shop builders. Western architectural authorities state that an urgent demand for building material, especially lumber, has set in. Profits on lumber since March 1, especially in the West, have been larger than a year ago. The general market is steady.

The trade of the country has been and is being badly cut up by Southern competition. A convention of Southern yellow pine manufacturers was held at Montgomery recently, and talked over uniform price-lists and more equitable freight-rates. The poplar manufacturers met at Cincinnati last week, and advanced prices on first and second clear mugh lumber. Forest fires have been doing their usual damage. Immense quantities of lumber are being moved on the Lakes, much greater than last year, and there is a demand for coastwise tonnage. White pine in Eastern markets feels the pressure of Southern pine more keenly than ever. Southern mill products are almost everywhere pressing Northern mill products. Stumpage values are declining in some localities in the West, and speculative values are announced on a good deal of Southern lumber territory. These fluctuations will act advantageously on both sections. The export demand for lumber is still increasing, and foreign dealers are carrying larger stocks. The brick-makers all over the country are pushing work forward, and most of them have contracts for all the stock they can deliver inside of ninety days, at least. Prices are strong. Brick-machinery makers are sold up. Cement supplies have been running down. Slate manufacturers are very busy on home and foreign orders. Planing-mill supplies are under better control, though stocks are still large. The iron trade is not very active, and prices have receded a little more. Textile production is guarded, lest a surplus of stocks above reasonable limits might lead to cuts and auction-sales, and thus hurt the entire market. Manufacturers are impatiently awaiting better conditions. Car and locomotive builders experience the effects of unsatisfactory returns of railroads. Between 500 and 600 miles of pipe-line for oil and natural-gas are to be laid this year. A fifteen-mile belt-line road is talked of in Philadelphia, to be built this fall and winter. Ship-builders are not able to keep pace with requirements. Car-builders expect to be overcrowded next winter. Steel rail-makers held a meeting at Philadelphia on Saturday, but failed to patch up an agreement. There is quite a rush of work in most small shops using lathes. The founders are not at all overcrowded, but the outlook is good. Carriage-builders and wagon-makers are busy. Dry statistics of trade furnish very little food for thought, except that those who control trade and production have the brakes applied and are slowing up, and are expecting to reach the bottom of the grade by July 1, when the country will be dangerously bare of stocks, but with a greater producing capacity than it ever had before. There are no fears entertained now of over-production, and but few business men, relatively, are deeply in debt for stocks. A general liquidating has been going on, and, considering the volume of business done, the book-accounts and discounted bank-paper is less than the business of the country generally carries.

S. J. Parkhill & Co., Printers, Boston.

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RUTCH & TILDEN, Architects.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 700.

MAY 25, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE list of entries for the examination for the *American Architect* Travelling-Scholarship will close June 1, and during the ensuing week contestants will receive their preliminary papers by mail.

WHILE preliminary competition for the New York Cathedral has ended in the selection of four designs, the authors of which are to take part in a final competition, to be decided about the first of November next, unless it should occur to the Trustees that this gives altogether too short a time for the elaboration of so important a work. The authors of the four selected designs are Messrs. Potter & Robertson, William Halsey Wood, Heins & La Farge and George Martin Huss, with whom was associated Mr. John H. Buck. Messrs. Potter & Robertson have long been known in the profession, and Mr. Buck is an architect of much experience. All the others are comparatively young men, but with an excellent reputation among their brother architects. Mr. La Farge, of Heins & La Farge, is the son of the painter.

WE have received a circular from the "Scripps League," calling our attention to an expedition of workingmen to the Paris Exhibition, which the League is preparing at its own expense. Never having heard before of the Scripps League, we are unable to give particulars as to the character of the persons who compose it, but it would seem to be a sort of association of Western newspapers, whose managers have seen an opportunity for combining philanthropy and business by sending out fifty men, thoroughly skilled in their respective trades, and capable of writing intelligibly about their experiences, to compare foreign machinery and processes with our own, and give their fellow-citizens and the newspapers that pay their expenses the benefit of their observations. If this is really the nature of the enterprise, or, still more, if it is the result of a movement still more purely benevolent, we are glad to wish it all possible success. At the time of the last exhibition in Paris, the British Government sent over a number of workingmen of special intelligence to make observations similar to those which the Scripps expedition has in mind, and the published letters of these workingmen were among the most interesting documents that appeared in relation to the exhibition. The circular sent us says that steps have already been taken to select men to go, and the managers of the affair desire that organizations of the mechanical trades should correspond with them in regard to the selection of others. Further information is to be had from the directors of the Scripps League Paris Expedition, Detroit, Mich.

M. CHARLES GARNIER wrote some time ago one of his half-serious essays on the disfigurement of city streets by hand-bills and painted signs, which has a great deal of truth and reason in it, and M. Planat has done his readers a service by reproducing it in *La Construction Moderne*. M. Garnier complains that he cannot go anywhere in Paris without having his enjoyment of the picturesqueness and architectural beauty of the streets nearly destroyed by the apparition of some huge sign or rude picture, so enormous as to take away the scale of the more worthy objects near it. As he says, no sooner does he begin to admire the perfect proportion and delicate detail of some beautiful front, than he sees on the side-wall of the adjoining house a representation of a gray overcoat, the Redingote Grise so familiar all over Paris, large enough to clothe the Colossus of Rhodes, which immediately destroys the effects he was admiring. The graceful windows become mere mouse-holes, the carefully studied string-courses and cornices disappear, and the harshness of the colors of the signs spoils the tone of the whole view. Most people, as he says, pay no attention to these things, but he cannot see why the public that does care for them has not a right to have its feelings respected. No one, as yet, would venture to go into the Louvre, and paste his little advertisement on the nose of the "Vièrge à la Chaise," or would even dare to hang a sign-board on the tail of Charlemagne's bronze horse in front of Nôtre Dame, yet the sign-painter does not hesitate to disfigure the vicinity of the Sainte Chapelle with his creations, and no architect has hitherto cared to complain in public. With us the practice of painting or pasting signs on every vacant surface is so inveterate that we can hardly conceive of a city view without them, but while it must be acknowledged that our architecture need fear less injury from such causes than that of Paris, we can console ourselves by thinking that our signs are much less objectionable than those of Paris. It is possible that the unrestricted competition of the composers of advertisements here has been the cause of the display of more taste in their manufacture than would otherwise have been shown: but, whatever the cause may be, it is certain that American posters and other things of the sort are superior to those seen anywhere else in the world. When we were first in Paris, many years ago, there was an exhibition of American posters and hand-bills going on somewhere in the city, which was at least considered interesting enough to be advertised. Since that period, the art of designing theatre hand-bills and soap advertisements has made great advances in this country, while it has stood still, apparently, in Paris, and if the exhibition were to be repeated, we imagine that it would attract no small attention, even from such artists as M. Garnier himself. Perhaps, in the present stage of the art, it might not be a bad idea for architects to interest themselves in such matters a little more than they do. It is getting to be quite common for architects to design the sign-boards which are to be placed on the buildings erected under their care, and the late Mr. Godwin, in England, gained a high reputation by designing the costumes and stage-settings for many successful plays. By combining these two things, and arranging to show a play attractively to the outside world, as well as to the audience, a clever architect might be of great service to a manager. Of course an artist, and a good one, ought to draw and color the figures to be displayed, but an architect might with much advantage arrange the surroundings of the picture to be displayed, so as to give it the utmost value and effect, and might often suggest decorative treatments of the composition or the color, which would make them far more attractive.

AMONG the curiosities of the Paris Exhibition, not the least interesting will be M. Garnier's "History of Habitation." This consists of a row of dwellings, beginning with a cave formed of stones, and overgrown with weeds and vines, followed by a lake-dwelling, restored from the remains found in the Swiss lakes, and this by an Egyptian habitation of the type of those existing in the period of the Pharaohs. Then come Assyrian, Phœnician and Hebrew houses, followed by Greek and Roman ones, and so on, through those of the Middle Ages, down to our own time. In order to utilize the buildings, all the dwellings except the caves and the Swiss lake-cabins, about whose inhabitants we know absolutely nothing,

are tenanted by people as nearly related to the real inhabitants as possible, dressed in costumes accurately studied, and surrounded by furniture of the style of the period to which the buildings are supposed to belong. In some cases the occupants are allowed to carry on a small business. Thus the inhabitants of the Etruscan house are permitted to dispense refreshments, which do not necessarily have the flavor of the eighth century B. C.; and a real Persian café occupies the Persian house, and is carried on by real Persians, dressed in their ancient costume, with Persian singers and musicians to divert the guests. In the Roman house is a glass-blowing establishment; the house of the Slavonic peasants is devoted to distilling rose-water from the roses of Kesanlik; and the Russians who live in their cabin make the characteristic wooden goods of Russia for sale among the visitors. Each house, by the skill of the Parisian gardeners, is surrounded by the plants of the country to which it is supposed to belong. The Egyptian house is buried in papyrus; cedars of Lebanon surround the Hebrew dwelling; the Japanese house is placed in the midst of a garden of cydonias, hortensias and other Japanese shrubs; and the Chinese one is hedged with bamboos, tea-plants, azaleas and fan-palms.

WE are gradually becoming wonted to having foreigners, especially Frenchmen, write amiable and appreciative criticisms on the work that our architects are doing. Other foreign critics, and particularly English writers, have a way of discussing the matter *de haut en bas*, so as to leave rather more sting than balm behind; but in another column will be found a review of our present work from a German standpoint, the general trend of which is more in line with French than English comment on American architecture. Not only do the French take note of our artistic progress, but the publication of a translation of our articles on "Builders' Hardware," which is now appearing in the pages of our estimable contemporary, *La Construction Moderne*, shows that they also appreciate the practical constructive ingenuity of Americans at a proper value. The publication of these articles in America and in France, supported, as they probably will be, by some exhibits at Paris, should make this a red-letter year for makers of builders' hardware in this country.

WORK has been recommenced upon the Hudson River tunnel, the necessary money having been raised in England, by a loan of nearly three million dollars. A commission of English engineers was sent out to examine the plans for the tunnel, and to inspect the work actually done on the ground, and their report, instead of being very unfavorable, as was at first reported, turns out to have been very favorable — so much so, in fact, that the same engineers are said to have made copious notes of the scheme, with a view to repeating the construction on a great scale under the River Ganges. Some of the English engineers, are, we believe, to stay and see the work carried out, and the force now in the tunnel will soon be increased, and the undertaking pushed rapidly to completion.

FIRE AND WATER gives a curious account of a fire which took place on an English steamer, on its way to Rio Janeiro. When the ship was still twenty-three hundred miles from its destination, the cargo was discovered to be on fire. All the ordinary means for extinguishing the fire were employed in vain, and the boats were got ready and provisioned for a long voyage. Having taken this precaution, the captain, a man named Thompson, who deserves to be remembered for his courage and ingenuity, persuaded the crew to remain on the ship, and keep on at full speed toward Brazil. The fire continued to spread through the cargo, and the deck and sides of the vessel became in places, red-hot, so that the sailors could only get about the ship by spreading sails over the deck, and keeping them constantly wet. Holes were then made in the deck, and steam, under high pressure, injected from a donkey-boiler. This application proved surprisingly successful, and after one night's work the fire was so much reduced that it was at first believed to have been entirely subdued. To finish it, water was pumped into the hold during the whole of the next day, but instead of quenching what remained of the fire, it seems to have rekindled, or at least increased it, and in twenty-four hours the deck and sides in the vicinity of the conflagration were again red-hot. Again steam was injected, and again the fire died away, and the temperature of the deck fell. It was then discovered that the coal was on fire in the bunkers on the port side, and it was hopeless to do anything more except to remove the coal. This was done as long as the men could work in the bunkers, and such of the cargo as could be reached was taken out of reach of the fire. Finally, after the crew had fought the fire for twelve days, the ship reached Rio Janeiro, with all its crew safe and sound except the captain, who had been badly burned on the leg in fighting the flames, and is to be consoled by the presentation of a medal from the Emperor, in recognition of his bravery and skill. The lesson which architects will draw from the story is that for fighting a fire in a confined place, steam appears to be far more effective than water. In fact, in this case the application of water seems to have increased the fire, in a way which can only be explained by knowing more about the character of the cargo than can be learned from the telegraphic reports.

A MANUFACTURING firm in Milwaukee had an experience recently with a rat, which is instructive. Noticing that the bills for water delivered through the meter were unusually large, the managers ordered an investigation, and at last discovered that the lead supply-pipe in one place ran in contact with a waste-pipe, also of lead. A rat, who frequented the waste-pipe, happening to be thirsty, and divining, by the curious instinct peculiar to such animals, the proximity of a supply of water, had gnawed a hole through the walls of both pipes, in order to get a drink. He succeeded in getting his drink, but omitted to close the hole again, and the water continued to flow through the meter, and out again through the waste-pipe, until the investigation revealed what had been done. Possibly some architect, who has had experience with rats, may do the profession the service of writing an essay on the subject of catching them, as well as of preventing them from doing mischief. We have heard it said recently that a rat will not gnaw a hemlock board, and that a grain-bin in a stable, if made of hemlock, or lined with it, is as safe against rats as if it were lined with galvanized iron. Whether this is so we cannot say, but some one ought to know about the matter, and if that person will come forward with his information, he will deserve the thanks of the building community.

EVERY one may not know that the renowned Leaning Tower of Pisa has been set up as merchandise by the municipality, and, in order to bring the highest possible price, has been made the capital prize of a lottery, which is to be drawn at some period unknown to us. According to the *Wiener Bauindustrie-Zeitung*, from which we gather this information, the city of Pisa has spent so much money on improvements that it is practically bankrupt, and its creditors are making themselves quite disagreeable by the urgency of their demands. In this strait, and, more particularly, to prevent the town-hall from being seized, the city government has bethought itself of one of its pieces of antiquity, and hopes to get enough for the tower to put off its duns for a time. Whether the tickets are being eagerly taken or not we do not hear. A native might, we suppose, make a certain income out of the prize by charging an admission-fee to visitors, but a foreigner would be better off without it than with it.

WHERE is a chance, perhaps, for one of our cities to get a first-rate statue, compared with most American statues, at a small price. Many people, especially those who appreciate the Parisian *etablissements de bouillon*, will remember the statue of Joan of Arc, which ornaments the middle of the little Place des Pyramides, opposite one of M. Duval's principal establishments. This statue, the work of Fremiet, has never been quite satisfactory to the artist's friends, and he has, as a consequence of a long course of badgering, determined to replace it with another, at his own expense. The model for the new statue has already been made, and is to be shown in this year's *Salon*; and, at the close of the exhibition, the sculptor intends to have it cast in bronze and put in place of the present one. Now, as any of Fremiet's statues, whether their author or his friends like them or not, would be a great deal better than most of the sculpture that does duty in America, and the "Joan of Arc," which will be a mere load on the artist's hands, could probably be bought for a low price, it certainly seems as if some of the rich citizens of some aspiring city might do their fellow-citizens a great service by securing it without delay.

A FOREIGNER'S VIEW OF AMERICAN ARCHITECTURE.[1]

WHEN the conditions are considered under which the art of building is exercised in this country, then a number of favorable circumstances will be noticed on one side that have not only aided in reaching the present high stage of development, but that carry in themselves promise of a still greater future. But on the other side we cannot fail to notice a number of obstacles and retarding influences, which, for the time being, will prevent America from becoming the birthplace of that future style of architecture the peculiar and unique beauty of which is supposed by some to be destined to overshadow everything the old world has ever produced during the long course of its civilization.

Foremost among the favorable circumstances doubtless is the great wealth of the country and its political power and independence. The absence of jealous and quarrelsome neighbors and the traditional disinclination of the American Government against meddlesome and adventurous interference with the affairs of others furnish a safe basis for lasting peace. The entire energy of the people is therefore devoted to win and utilize the inexhaustible treasures of the soil and a competitive progress is thus caused, the astonishing results of which are the subject of world-wide admiration. The enormous wealth accumulated in this way enables governments, municipal administrations, corporations and single individuals to devote to building purposes amounts which exceed the greatest donations ever made for the same purpose by the princes, the republics or the churches of the old world.

In the buildings put up by the federal government the endeavor is noticed to give expression to the majesty of the highest power resting in the people itself. States and cities vie with each other to give a monumental and imposing form to the structures which are destined to harbor their legislative bodies, their administrations, their courts of justice; the great industrial, mercantile and railroad corporations raise mighty buildings expressive of their sphere of action; wealthy citizens and families enter into a noble competition in founding and lavishly endowing churches, universities, libraries, schools, museums, hospitals and other establishments of public use, and in all these cases ample means are furnished to create something great and lasting. The characteristic distavor with which the typical American regards anything small or petty on no occasion shows itself more than in his willingness to *give* unstintedly in order to *obtain* something standard and sterling.

In a country like this, filled with the restless spirit of enterprise, the architect will be called upon to solve problems of the most interesting kind, sometimes wholly unique, such as, for instance, the construction of an entire town, which was completed in the vicinity of Chicago by George Pullman inside of three years. Such circumstances coupled with the independence of mental grasp and ideas, that is produced by the all pervading liberty of action and movement, will naturally tend to heighten the inventive and the creative power of those to whom the execution of such extraordinary projects is entrusted. They will commence their task, unlike the masters of the old world, free from those bonds in which traditions and impressions of a great past have held the imagination since the days of youth. Thus they will produce something new and unique, which may bear the stamp of creative genius.

Wherever there is light there must also be shadow,—this old rule holds good here as elsewhere. The very same circumstances, which favor the invention of new forms also carry in themselves the danger of arbitrary and whimsical ideas taking the place of the beautiful and the practical. The eternal laws of beauty, which are recognized and understood only after a careful study of the best monuments of all ages are easily lost sight of by those, who, without having gone through a thorough course of training, have commenced in early years to work independently. Similar opinions are evidently gaining ground among American architects themselves; the Western Association of Architects, for instance, has resolved that the right of architectural practice should be made dependant on a State examination.

Without at present entering on questions of style, I believe that the great and undisputed advantages of the best specimens of modern architecture in this country mainly consist in the happy distribution of the masses, in the artistic treatment of wall-spaces, in the predominance of gravity of expression, and above all in the effective crowning of buildings, in the way in which their upper parts set off against the air. I do not believe that these American creations can be excelled as regards profile and general impression from a distant point-of-view. Another point that deserves commendation is the sterling solidity with which elevations are constructed. With rare exceptions, there is nothing false, everything is genuine and presents its natural appearance. The experienced observer will regard with especial interest and satisfaction the excellent treatment of wall-spaces in natural stone material, the striking effect obtained by finishing the surfaces of the freestone in their natural grain, sometimes rough and heavy, sometimes finer, and finally, in well considered contrast thereto the charred and polished surfaces which set forth to the fullest advantage the color and the grain of the various kinds of granite, marble and sandstone, of which this country possesses such a marvellous abundance.

An equally healthy and novel treatment we find in the better specimens of brick buildings and in the application of effective terra-cotta ornaments. The interiors show the same sterling quality of material; in the flooring, the wainscotting and panelling, be it of stone, or of glazed material, or of wood we observe an excellent understanding of forms and colors, which knows how to attain the finest effects by utilizing all available means, such as checker-work, colored-stones, metal or glass.

It appears to me, however, that a certain contrast exists between the beautiful exterior, which gives evidence of so much talent, and the invention of the ground plan. Clearness and beauty of the latter, which certainly should be among the principal aims of the architect, do not seem to me to receive sufficiently weighty consideration; solutions are accepted, which might be improved upon by careful study and ripe experience. Correct proportions in length and width, alternation in size and form of plans, proper expression of the relative importance of each room, imposing spans for stairways uniting in themselves the requirements of utility and beauty, in short all those elements of invention which determine the impression of space in architecture, do not appear to me to be considered as much here as they are in the monumental structures of Europe. Sometimes even, the first practical requirements of air and light are not sufficiently considered.

Casting a glance now at the ecclesiastic architecture of the United States, we have to remember, that it cannot be measured with the same scale which is applied to the most perfect cathedrals of the old world; but here we must bear in mind the youth of the country, the great number of congregations and sects, as well as the fact that the means for the erection of churches are raised by the congregations themselves, without government aid. When all this is duly considered, then we can only judge favorably of what has been done in this field. From the wealthy and large cities down to the smaller townships, nearly every one possesses a number of churches, which if not grand and imposing, yet present a harmonious and pleasing appearance. The style of most of them is derived from mediæval traditions, but frequently happy and original novelties are found and the general impression of nearly all of them is beautified by nestling wall-creepers, or by surrounding groups of trees, shrubbery, etc.

According to votes collected by the *American Architect*, Trinity Church, in Boston, is looked upon as the finest building of its kind in the United States. This church was built by Gambrel & Richardson and doubtless is an important as well as an instructive structure, because it is independent of all traditions. Contemporaneous opinions on such a work will always be more or less prejudiced and final judgment in this case must therefore be left to posterity. From a point-of-view more free than ours, she will decide whether the more wordly features of this architecture will satisfy future generations, and will create the same impression of sacred mystery that is found in the purely ecclesiastic forms of the old Christian, the Romanic, the Gothic, and the Renaissance periods; again, whether this interior, which is devoid of the imposing crowning of a vault, in majesty and grandeur approaches the ideal as nearly as do the venerable works of the past.

Judging from such a point-of-view, it is probable that many will prefer to the Boston Church, the New York Trinity Church, built by Mr. Upjohn. From Trinity as well as from Grace Church, which forms a beautiful group in connection with its rectory, a friendly spirit seems to breath into the hastening and nervous life of Broadway. Both are works on which the observer's eye rests with undivided satisfaction; are they less perfect or less important because they speak to us in a language of forms that has become well-known and dear to us through history and tradition?

It would evince a lack of correct judgment not to share the enthusiasm, with which Americans regard their Capitol at Washington, especially, when it is remembered, that the building was not constructed at once, but was gradually made what it is to-day: seven architects share the honor successively of having contributed to its completion. From its wisely selected site, its beautiful contours, crowned by the effectively moulded cupola, shine far into the country, dominating the entire landscape. In its general character it unites the refinement and the magnificence peculiar to the forms of Renaissance, but it is a matter of regret that the front elevation is turned away from the city. In view of its manifold beauties, however, this defect is easily overlooked, as well as the farther ones of the ground plan, with its intricate corridors and its modest stairways, also the fact that the cupola with its columns and beams is not as it seems a solid stone construction but one of iron.

Among the numerous great and magnificent buildings put up by States and cities for administrative purpose, the Connecticut Capitol, in Hartford, appears to me to be an especially meritorious work. The Albany Capitol, notwithstanding many external beauties and excellent interior details, cannot be rated equally high as regards

[1] By C. Hinckeldeyn, former Technical Attaché to the German Legation at Washington.

novelty of invention and general proportions; neither is it to be expected that the present favorable opinion of the majority on the Philadelphia City-hall, will be indorsed by posterity. The much-contested selection of the site was decided by public vote, and the architect in this respect had to make the best of given and unalterable conditions. But, it having been decided to erect the building on the crossing of two main thoroughfares, would it not have been natural to construct great and imposing openings for them, instead of the insignificant entries in which they are now lost to sight? Is it not a non-artistic exaggeration to develop from out of this building a tower rising to the enormous height of 535 feet? Is it too late to hope that, at least, the barbarous idea may be abandoned of crowning this dizzy height with the venerable figure of William Penn?

The public buildings subject to the Treasury Department (court-houses, post-offices and revenue buildings) evince an unmistakable family-likeness and, notwithstanding excellent execution, a lack of inventive talent, which, however, is readily understood by one who knows the system according to which these structures were designed. The incumbents of the position of Supervising Architect, in their annual reports during the last ten years, have constantly called attention to the difficulty of giving an individual appearance to buildings in which the practical requirements are alike. This difficulty cannot be overcome by a single individual moving in the routine of office. Why, for instance, is the impression of the New York Post-office so unsatisfactory a one? Is it not the lack of contrast in the various stories, the subdivision of all wall-surfaces by means of columns arranged on a small and petty scale, and the non-artistic details, noticeable, for instance, in the absence of any swelling of the cylindrical columns?

If this is compared with the forms invented by a talented artist for a similar public building, for instance, the Jefferson Market Court-house, built by Mr. Withers, then it must be conceded, that success or failure is not a question of the problem itself, but merely of the way in which its various features are grasped.

The main buildings of great railroad corporations may be looked upon as a group in which modern architectural ideas appear most expressively, a number of remarkable examples of which are found in the great cities. The depots of the Pennsylvania Railroad in Philadelphia, of the Boston & Albany Road in Boston, the Dearborn depot in Chicago, and the Grand Central depot in New York, give striking evidence of the ability with which their architects have raised these buildings beyond and above the mere requirements of practical use to the sphere of monumental importance.

Equal appreciation is doubtless due to the numerous buildings devoted to scientific purposes, the universities, colleges and libraries, as well as to the institutions of charity and hospitals. Whose heart would not be filled with genuine satisfaction on passing through the manifold buildings of venerable Harvard University; who would not admire the grand institution of the Johns Hopkins Hospital, the pride of Baltimore? And surely every one, who ever crossed the Potomac from Washington to Arlington, will retain the memory of the impression made by Georgetown College, high above, with its effective forms so grave and yet so animated.

A decided disappointment, however, is experienced on turning to the American institutions for public amusement. In the erection of theatres, for instance, the instinct of business and of utility on the part of the owners, has compelled the architects to depart farther from compliance with artistic demands than in any other field. The greater number of theatres are hidden behind dwelling or business fronts. These are, therefore, *a priori*, not to be counted among works of art; but the true character of a temple of art has rarely been developed, even in those cases where circumstances permitted the erection of an independent structure, standing free from its surroundings. It will be conceded, for instance, that the exterior of the New York Metropolitan Opera-house does not betray in any way its destination, although the means at disposal were ample. In the interior there is no lofty and spacious hall, no magnificent stairway, and the auditorium, which is reached through low and insignificant ante-rooms, impresses us as barren and cold.

The interior of the Casino, opposite to the foregoing, doubtless is of a high artistic order. Original and varied forms and magnificence of colors unite in impressing the visitor, and carrying his mind into the sphere of imagination. But it seems a somewhat strange whim on the part of the architects, Messrs. Kimball & Wisedell, to select for the front of a New York theatre the forms of Moresque architecture, the massive wall-spaces and small openings of which are adapted alike for defensive purposes and for affording shelter against the rays of the sun in a hot climate. Again, notwithstanding the assurance that everything is fireproof, an uneasy feeling is created when ascending those winding stairs by the thought of what might be the result of a panic when everybody rushes towards the exits.

One of the most horrible examples in this line is found in the new Opera-house, at Chicago, which really is nothing but an immense red brick box of the most incredible forms and proportions. On the other hand, I would name as works deserving all praise, the Academies of Music in Philadelphia and Baltimore; in the latter the architect, Mr. Neilson, has succeeded with moderate means in creating a simple but characteristic exterior, an excellently arranged ground plan and a pleasing interior.

The mighty buildings devoted to business purposes are more and more becoming a decisive element in the appearance of the large cities of this country. The mere technical achievements found in them, may doubtless be pronounced to contain the sum and the substance of all modern constructive possibilities and knowledge. Only a minority of them, however, will stand an æsthetic scrutiny equally well. I will depart from the rule and only review the favorable exceptions. I believe comparison to be admissible between the proud Palazzo Farnese, towering with its grand horizontal lines above the multitude of houses of Rome, and the Produce Exchange dominating in the picture of lower New York. Nay, more, the latter appears to me even more impressive than the first named, through the addition of the proud tower, which, with its calm and beautiful contour and its effective composition, forms a far-visible characteristic feature of New York. The architect, Mr. Post, a most gifted master, in this building has shown the meaning of true and genuine effects in architecture. In this simple work you do not find any weak results, no playful divisions, no meaningless ornaments; but you find grave and grand wall-spaces in noble proportions, and decisive contrasts in the various stories, everything true, natural, practical and perfect in its entirety—with perhaps the single exception that the main entrances are not sufficiently characterized, and that the form and color of the small projecting granite supports, in a measure, disturb the harmony of the lower portion.

A second remarkable example is the well-known Sloane Building, on Broadway. Its purpose could scarcely have been expressed better than has here been done by its architect, Mr. Wheeler Smith. In the treatment of the pillars, in the arrangement of the large light-openings, in the placing of the intermediate columns of iron; in short, in the composition of the whole, as well as of the details, a true artistic spirit, confident of success, is manifested.

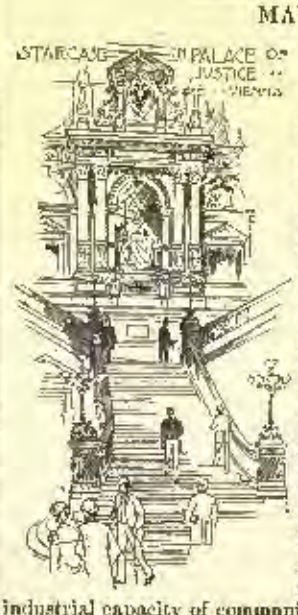
Now, very different, however, are the latest works out West, notably those of Mr. Beman, the gifted architect of Pullman City. In the treatment of the freestone at Studebaker Bros. manufactory building, in Chicago, and at the Northwestern Life Insurance Company Building, in Milwaukee, a transition appears to an affected aboriginality, not to say brutality, and the various members, forms and proportions are handled in a way that can scarcely be pronounced a progressive one. The same is true of the almost grotesque bank-buildings on Chestnut Street, Philadelphia, in the forms of which the last vestige of proper restriction appears to have been lost sight of.

Finally, I have to mention dwelling-houses. From Mr. Hunt's magnificent work—the Vanderbilt house—down to the modest foliage-hidden cottage of the suburbs, what wealth of imagination, what grace of form and what diversity of plan and exterior! Is it erroneous to suppose that the great development of dwelling-house architecture in this country is largely due to the refining and ennobling influence of its women?

I have seen multitudes of cosy houses in Washington, Baltimore, Philadelphia, Allegheny City, Chicago, Milwaukee, St. Paul, Minneapolis, Buffalo and Boston, and the impressions that I have received from such inspections I count among the most instructive, pleasing and lasting ones.

In conclusion of this sketch, I would say that from a point-of-view rising above national prejudice, it is to be sincerely hoped and wished that American architects may continue in the splendid beginning that they have made, and that they may succeed in obtaining that place of honor in the world's history of culture at which the best of them are aiming!

MALARIA.—I.



FORTUNATELY, the question of malaria has not with us, in our temperate climate, the fatal significance that it has in the tropics. With the exception of yellow fever, which reaches us but rarely, and which seems to require for its development something more than the ordinary malarial condition—probably the concurrence of filth—we have no disease of miasmatic origin that is seriously fatal. However, the milder but still persistent types of malarial affection are very widely scattered throughout most of the United States, and when we consider the degree to which this affection produces discomfort and disability, and the results of its complication with other diseases, we may justly regard it as one of the most serious scourges to which we are subjected. It does not figure to any great extent in our death-rate, but it most seriously aggravates our health-rate, and it lowers to a marked degree the industrial capacity of communities subject to it.

This disease is singled out for exceptional treatment here because of the well-founded belief that it is largely due to excessive soil moisture, and that good drainage constitutes almost universally its most effective remedy. It is not proposed to touch upon its characteristics as a disease, nor upon its medical treatment; only to

consider its causation, and the manner and extent to which it may be prevented or modified by improved drainage.

As to its causation, we are really much less clear now, when we know so much more about it, than our grandfathers were with their limited knowledge and more positive hypothesis. A belief in the relation between malaria and undue soil moisture has prevailed through all time, so far as our records reach. There is little doubt that not only the Romans but the races who preceded them in southern Italy held this belief and acted upon it.

The drainage works of the Roman Campagna, which are supposed to have existed before the Roman period, were probably carried out with the intention and with the effect of increasing the salubrity of the country. It is thought that it is largely due to the fact that these works have fallen into disuse that the Campagna owes its present gravely unhealthy state. The belief that malaria was caused by marshy conditions, was formulated and clearly set forth by Lancisi in the seventeenth century. His writings and the records of the observations and discussions of his successors for a century and a half constituted the basis for MacCulloch's elaborate essay[1] on the subject, which, in spite of its peculiarly turgid style, remained until recently a standard authority on malaria.

MacCulloch accepted in its entirety Lancisi's theory that malaria is due to a combination of excessive moisture, a certain considerable elevation of temperature and the decomposition of organic matter. These conditions were most prevalent in the case of actual marshes, the uncovered borders of which where known to be peculiarly pernicious, but malaria was found to be produced extensively in lands which were not at all of a marshy character. MacCulloch says:

"I am persuaded that it will be found the very common cause of the malaria and the disease produced by the lands of this class. In the extreme case, it is inundation and subsequent drying, failing, therefore, to be considered again elsewhere, in others, it is that drying during spring and summer, which follows the moist or wet condition of such meadow lands, as they are left by the winter rains. Instances of this, in all its degrees, abound everywhere: but as one established example is enough, I may point out the lands about Fontainebleau, at the junction of the Yonne and the Seine, notorious for the 'Fievre du Pays'; so injurious, that few escape fever or intermittent over a considerable tract, while it is a pure example, inasmuch as there is nothing else present; nothing but that drying of moist meadows, whether previously inundated or otherwise wetted in winter, which takes place under the summer heats. How extensively this cause operates as to meadow lands in all cases, be their character what they may, I need not add; and I may, therefore, safely conclude, that wherever the heat of the climate is sufficient, such tracts will be among the most common causes of disease."

He cites many instances in England where the presence of small streams and of soil moisture much less marked than that of marshes has led to the production of the disease. He also recognizes the fact that complete saturation of the ground is less to be feared than a less, but still sufficient, state of wetness.

"This fact is, in another sense, of some value, as tending to explain what I formerly remarked respecting the occasional increase of malaria in certain parts of Europe from attempts at drainage. It serves to show what was then suggested, that a very wet state of the soil was not so injurious as some one intermediate between complete inundation, or swampiness and absolute dryness."

This bad effect of drainage he regarded, however, as only temporary, for he says:

"The simplest and the best known case of the diminution of malaria, is that which arises from the drainage of marshes, swamps or fens; and, to that drainage, governments and the people both have often had recourse with this very view, since this is a part of the subject on which there are no differences of opinion."

Again, he says:

"To proceed, and to the reverse case, it is plain that wherever a tract of dry land has been converted into a marsh by inundation, whether from a breach of the sea or the overflowing of rivers, we must expect an event the opposite of the preceding, or the production of this poison where it was before unknown. I need not dwell on a subject so obvious; but the history of all lands is full of events of this nature, even on a great scale; while in our own country, from the inundation of rivers, even where the effect is far short of producing a swamp, being often the neglected cause of what are popularly called sickly seasons, in certain districts of England, as might easily be proved by a reference to facts in great number. . . .

"I may quote one instance among ourselves of the complete extirpation of malaria by the drainage of a very small piece of water, and it is worth quoting, as equally proving a then almost unsuspected cause and its remedy. This was the North Loch of Edinburgh, formerly noted for producing agues, which, since the drainage of that spot, have disappeared. And even the insignificance of this spot renders it a valuable example, as proving how very small a body of water is capable of being a permanent source of the disorders of that nature, even in a climate so little favorable to the production of malaria as is that of Edinburgh."

[1] "*Malaria*": An essay on the production and propagation of this poison, and on the nature and localities of the places by which it is produced, with an enumeration of the diseases caused by it, and of the means of preventing or diminishing them, both at home and in the naval and military service, by John MacCulloch, M. D., F. R. S., etc., etc., Physician in Ordinary to His Royal Highness Prince Leopold, of Saxe Coburg. Philadelphia: Printed and published by Thomas Kite, 64 Walnut Street. MDCCCXXIX.

In MacCulloch's time the means did not exist for studying the character and habits of the minute organisms which are now supposed to be active in the production of so many of our diseases, but he says:

"That the poison of marshes consisted in animalcule invading the body through the lungs, sometimes, I presume, through the stomach also, is a speculation which dates as high as Lucretius, Varro and Columella, which seems to have been renewed in the days of the microscope, by Kircher and some others, and appears, naturally enough, to have found favor with Linnæus."

One of the most interesting of modern writings on the subject is an essay of more than forty years ago by Dr. John Kearsley Mitchell, of Philadelphia, "*On the Cryptogamous Origin of Malarious Epidemic Fevers.*" This essay also was written long before the perfection of the microscope enabled us to begin the study of microbes, which is now receiving so much attention in the scientific world, but it foreshadows the results of that investigation in a rather remarkable way. Dr. Mitchell advanced what he called the "notion" that malarial infection is wrought by the action of a special cryptogamic growth, and he made this notion fit the various conditions of locality, temperature and season favorable to the production of malaria in a manner that seems *prima facie*, more universally satisfactory than any previous theory on the subject; for example, this seems, better than any other theory on the subject, to account for the fact that malarial fevers are much the most active in the autumn, at a time when lands are drier and when the temperature is lower than in summer. It is at this season that the growth of fungi is the most active. In like manner, if we accept the fungoid origin we may better understand how the spread of the fungus should be arrested, as is the progress of malaria at times, by a wall, a road or a stream. Dr. Mitchell's essay cannot be regarded as of scientific value, but it must seem at least curiously prophetic in view of the now prevalent theories which connect malaria with the growth of an infinitesimal cryptogam, such as the *bacillus malariæ* of Klebs and Tommasi-Crudelli.

Dr. Mitchell's suggestion is much more carefully and thoroughly worked out than was that of Dr. Salisbury, who, in a paper contributed to the "*American Journal of Medical Science*" for January, 1866, laid claim to the discovery of the cause of malarial fever in the spores of a very low order of plant. He stated that he had found these spores in the secretions of fever patients and of no others, and that he had collected them on glass plates suspended over marshes and other malarious lands. Starting from this point, he proceeds with circumstantial statements that seemed to the unprofessional mind to be sufficient to show that the plant producing these spores is always found, in the form of a whitish, green or brick-colored incrustation, on the surface of fever-producing lands; that the spores, when detached from the parent plant, are carried in suspension *only in the moist exhalations of wet lands*, never rising higher (usually from thirty-five to sixty feet) nor being carried farther than the humid air itself; that they most accumulate in the upper strata of the fogs, producing more disease on lands slightly elevated above the level of the marsh than at its very edge; that fever-and-ague is never to be found where this plant does not grow; that it may be at once introduced into the healthiest locality by transporting moist earth on which the incrustation is forming; that the plant, being introduced into the human system through the lungs, continues to grow there and causes disease; and that *quinia* arrests its growth (as it checks the multiplication of yeast plants in fermentation) and thus suspends the action of the disease. Dr. Salisbury's theory was never adopted by the medical profession, and has now little more than a curious interest. Dr. Mitchell says:

"The only theoretic view of malaria to which I incline is that which refers marsh-fevers and some of the epidemic diseases to a living organic cause capable of reproduction by germs, as is alleged of contagious diseases; but, unlike the latter in this, that the germs are not reproduced by the organism of the sick, but exteriorly to and independently of the human body. In other words, that as the germs of contagious diseases are reproduced *in* the body, the germs productive of malarious and other non-contagious diseases are elaborated and re-elaborated *out* of the body, and independently of its agency. One is the product of *person*, the other of *place*. This notion is sustained by the fact that organic azotized substances are the only things detected in marsh air or dew which can possibly affect the health injuriously."

Leon Colin's treatise on "*Intermittent Fevers*"[2] is an important recent contribution to this discussion. He prefers the term *intoxication tellurique* to the common one, *intoxication palustre*, which recalls only one of the conditions of the toxic action of the soil. He goes on to say:

"It is in more logical accordance with the immense development over the surface of the globe of these affections, whose appearance is subordinate:

"1. Neither to the existence of marshy sites, especially in the tropical zone, where the soil is rich enough and is sufficiently heated by the sun to suffice for the production of the most energetic fever-producing miasm;

"2. Nor to local geological conditions, for these fevers may appear on land of very diverse formation;

"3. Nor, finally, to the geographical distribution of certain plants, because there may be the greatest differences between the vegetable species of regions that are equally affected."

[2] "*Traité des Fièvres Intermittentes.*" Paris, 1870.

He thus states his opinion on telluric intoxication:

"This intoxication being the morbid result of the productive power of the soil when this power is not properly directed, we must come at last, therefore, to the cultivation of a suitable vegetation in seeking the sanitary improvement of affected regions."

The summary of the subject at the head of his first chapter is as follows:

"Fever is not due to the sole influence of marshes. It is not due to a special vegetation. In the greatest number of cases, and especially in warm climates, it is produced by the exhalations of the soil."

He says that where marshes are wanting, an attempt has been made to supply the deficiency by the hypothesis of a sheet of underground water constituting by its oscillations, under the influence of rain and of the waters that supply it, a sea comparable to the palustral type, and, like this, emitting its effluvium at the surface of the soil by reason of the porosity of the layer that covers it. He says:

"We are far from denying the influence of this underground water, an influence so well established during the last century by Lind, who, in Holland, estimated the various degrees of salubrity of the soil according to the depth to which it was necessary to dig for wells; but what we do absolutely deny is that these layers of water have an action comparable to those of marshes at the surface of the ground; that they, in a word, constitute a palustral medium. . . . The fibriferous miasm need not be sought so far away, as this seems irrefutably to prove. In those countries where the absence of marsh has caused a recurrence to the hypothesis of the existence of 'subterranean marshes,' it is noticed during the season of fevers that the least rain suddenly increases the number and gravity of the fevers. The more dangerous of these rains are the lighter ones, those which, instead of reaching the latent sheet of water in the ground, are only absorbed by the surface-soil. It is, therefore, especially this surface-soil which is dangerous, and the water below has no other injurious influence than perhaps to furnish it with the conditions of humidity necessary to noxiousness, and comparable to what results from rain.[1]

"Furthermore, it is only at the surface of the soil that fever is produced; whether in the tropics or in our own clime, there is no special danger in an exposure to exhalations from the deeper layers of the ground, and miners furnish far fewer patients than workmen employed in clearing and in cultivation."

This may be true as relating to mines or other deep excavations. It certainly is not true with reference to deep disturbances of the surface-soil; it is well-known that in our own country excavations for sewers or water-pipes during malarial seasons give rise in suitable localities to outbreaks of malaria. San Diego was made peculiarly unhealthy in the summer of 1888 by the large amount of street-grading then carried on, with the removal of considerable volumes of earth. Malaria has not been in modern times a marked feature of Paris and its immediate vicinity, but heavy earth-works carried on in the establishment of a new line of fortifications about the city gave rise to widely prevalent malarial diseases, which disappeared soon after the completion of the work. Similar instances elsewhere in the temperate zone have been frequently observed. Of course, all of this work involved the disturbance of the surface-soil. Indeed, Colin himself says:

"We recall the serious epidemics of intermittent fever which were developed in France during the earthwork incident to the construction of railroads — work that was executed in great part in dry countries, but where the first result was to bring into contact with atmospheric air masses of soil which had for a long time produced no growth."

But such disturbance of the surface in the constantly-repeated work of plowing and digging for cultivation has not produced the same result to any marked extent.

The following quotations from the same treatise are of interest in this discussion:

"We are far from pretending that fibriferous miasm may not originate in the putrid decomposition of vegetable matters, as we admit, further on, that the soils richest in organic detritus will generally be the most dangerous to disturb. But we think that the influence of putrefaction has been exaggerated; the rotting of flax is dangerous, more dangerous than Parent-Duchatelet thought, but still much less than was probably believed before the experiments of this *savant*.

"In my opinion, the fever is caused, above all, by the vegetative power of the soil when this power is not developed, when it is not exhausted by a crop sufficiently abundant to absorb it. Indeed, in marshes themselves, vegetation seems to be the most effective condition for rendering them innoxious, so that ponds surrounded with a luxuriant vegetation, or of which the surface is covered with aquatic plants, are infinitely less dangerous than marshy surfaces which have no active vegetation. . . . When are marshes in their most dangerous condition? It is when, by drying, we expose to the air more or less of the submerged surface, when, consequently, we expose a soil of enormous vegetative power, and which, formerly covered with water, has accumulated perhaps for centuries the elements of this power. The fevers which are then produced are not due to the emanations furnished by the putrefaction of organic matters contained in the exposed earth, for these fevers continue to be developed after the marshy layer has become solidified as more or less dry ground, all putrid decomposition being arrested.

"In Algiers, fever was developed in regions which seem to offer conditions absolutely the opposite of the conditions of the swamp, in localities apparently the dryest and the most sterile, having neither the humidity nor the vegetation nor the decomposition of a marsh. But, on the other hand, these lands which appear so sterile have an enormous productive power. In the vast and sandy plains of Sahel there is needed only a thread of water and a simple scratching of the earth to produce, as by enchantment, a luxuriant vegetation. It seems as though there was in reserve in this ground that which, developed by the least cultivation, is as propitious to the growth of crops as it is fatal to man if he subjects himself to its influence before its fertility has begun to become exhausted."

Similar observations are made in California and in our dry Western plains, many portions of which are malarious under all conditions, with a sudden and great aggravation on the introduction of irrigation.

"The richer the soil in humus, and the more it resembles a marsh, the less is extreme heat necessary; on the other hand, the less the vegetative power of the soil, the more heat is necessary for its toxic action. This explains the difference of conditions necessary for the production of fever according to season and to climate.

"The results secured in a few years in different marshes in Sologne, in the Duchy of Baden, near Mannheim, in the environs of Bône and Boufarik in Algiers, and in all the northwest parts of the United States, where fevers have singularly diminished, demonstrate with what rapidity such transitions can be accomplished. Whatever may be the danger of these works of improvement, they ought, once begun, to be energetically and actively followed up; to diminish their duration is to diminish the number of the victims who, in this battle of man with the soil, as in all wars, are the more numerous according as the war is prolonged. The works of drainage and cultivation at Staoueli (Algiers), carried on with rapidity from the start, caused the death of 8 Trappist monks out of 28, and 47 soldiers out of 150 detailed to them. In 1848 the surroundings of the convent have a new aspect. The soil is drained and is covered with fine crops, and with from 150 to 200 inhabitants only two succumbed in eighteen months. To accelerate the work of drainage and cultivation is to concentrate the mortality within a short period, and to hasten the definite establishing of salubrity."

A peculiarly pernicious effect has always been ascribed to the invasion of marshes and low lands by the combined flow of salt and of fresh water. Probably this influence is felt in many of our own seaport localities. Colin recognizes this as an important feature of his subject, saying:

"But when, instead of having to attack a malarial site of restricted size, whether a salting-pond or not, it is a question of undertaking the improvement of vast deposits contiguous to the shore and at the very level of the sea, presenting over an immense area the especially insalubrious conditions of the mixture of fresh and salt water traversed by streams of such slight current that their deposit adds to the bar that separates these marshes from the open sea, then the means to be used will be of various sorts, and the work of transformation will be long and difficult."

We know with what admirable tenacity the people of Holland have worked for the drainage of their land, calling to their aid the most powerful hydraulic apparatus and employing steam-power without interruption for years. But in countries where the public wealth is not so well suited to the application of such efforts, where the population is less dense and less active, where, also, the climatic conditions are less favorable to the workmen because of a high temperature, the improvement of marshes of great extent becomes a task much more difficult, and at times impossible. This is illustrated by the Pontine marshes and others. He quotes from Melier the striking illustration of Viareggio:

"By reason of the establishment of a barrier between the fresh-water and the water of the sea, the village of Viareggio hitherto abandoned and consisting only of a few fishermen's huts grouped at the foot of an old tower where those condemned to the galleys were confined, has become an important town, and so sought after that the first families of Lucca have used it as their summer resort, and have built castles and villas there. This fact of sanitary regeneration, due only to the exclusion of salt-water, is all the more curious and decisive, because it has already had its counterproof. In 1768 and 1769 malaria suddenly reappeared with the force of its worst days. In the course of these two years there were 170 deaths in the total population of 1,850, that is to say, about one in fifteen. What had happened? Only one thing; the barrier had got out of order and the mingling of the two waters had begun again. The barrier was repaired and the malaria disappeared. In the following year there were only thirty-two deaths, or only one in forty."

Speaking of the difficulty attending the first cultivation of rich malarious lands, he says:

"Fortunately, modern agriculture now applies on the largest scale a process which singularly lessens these dangers, and which has the result not only of increasing the fertility of the land, but further of aerating the soil in the most complete manner; this process is drainage, which, in the highest degree, has the property of purifying the land to which it is applied. The aeration of the soil, says Barral, is certainly the chief end of the work of cultivation. The augmenting of aeration is an effective means of increasing the fertility of the soil. . . . It may be said that there is aeration every time that rain falls and drives out the stagnant air of the soil, and a new aeration each time that this water, drained away little by little, leaves voids to be occupied by air, which will be driven out again by the next rain.

"Tardieu says that drainage is of the first importance to the public health. It is now no longer permitted to doubt its effective action in improving the sanitary condition of the atmosphere, and many countries recognize the benefit. It has been said in England that drainage has, so to speak, changed the climate of that country, that in the marshy districts of Lincolnshire, fogs have diminished nine-tenths in intensity, and that the health of the people has been greatly benefited. . . .

"The modification that the soil undergoes is not a simple washing

[1] This is probably all that the adherents of the "Subterranean Marsh Theory" claim for this water, and it seems to be enough.

No. 700. American Architect and Building News, May 25 1889.

"KING·MEMORIAL"·DECORATION·SAINT·PAUL'S·CHURCH·AUGUSTA·GA·

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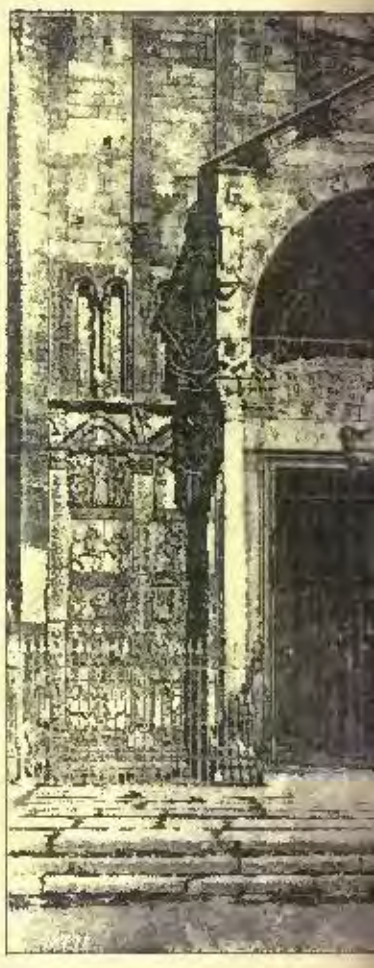
·ST·ZENO·



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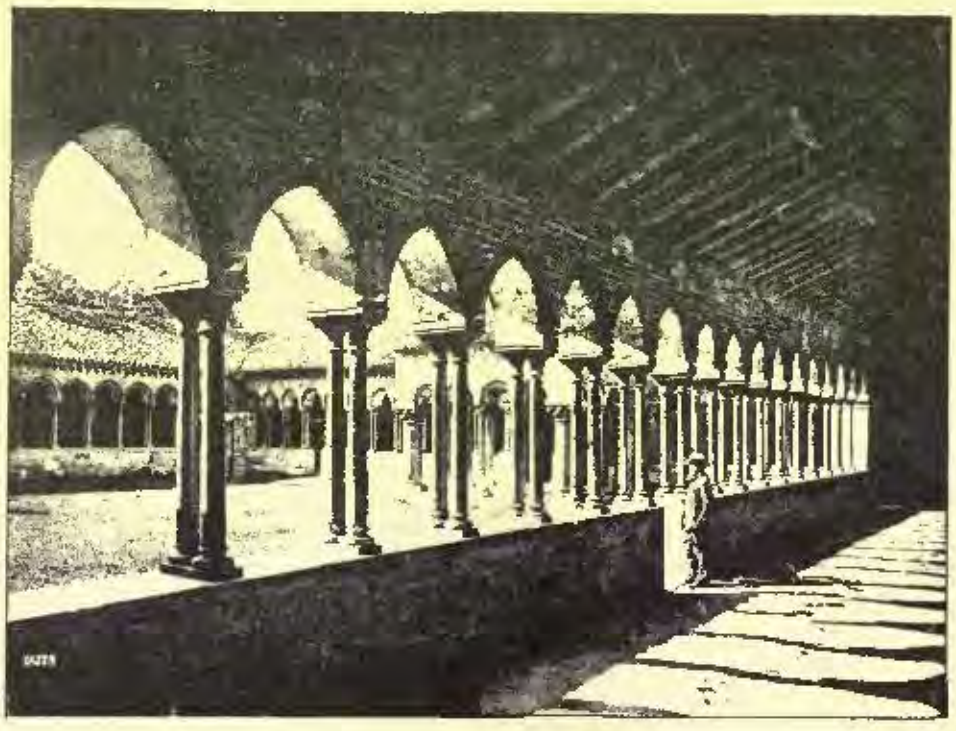

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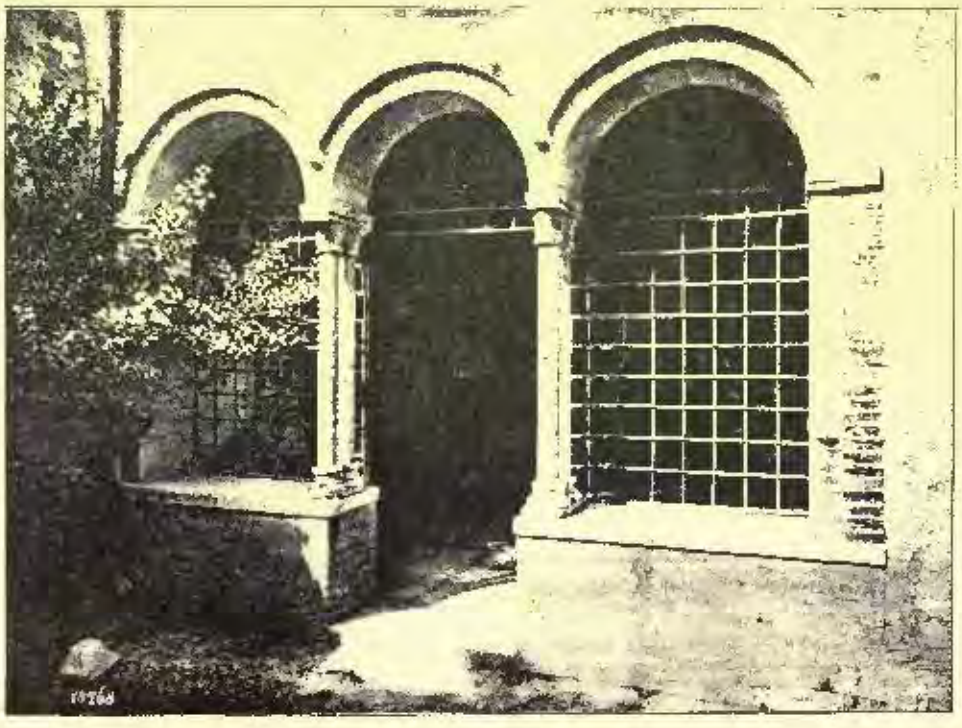

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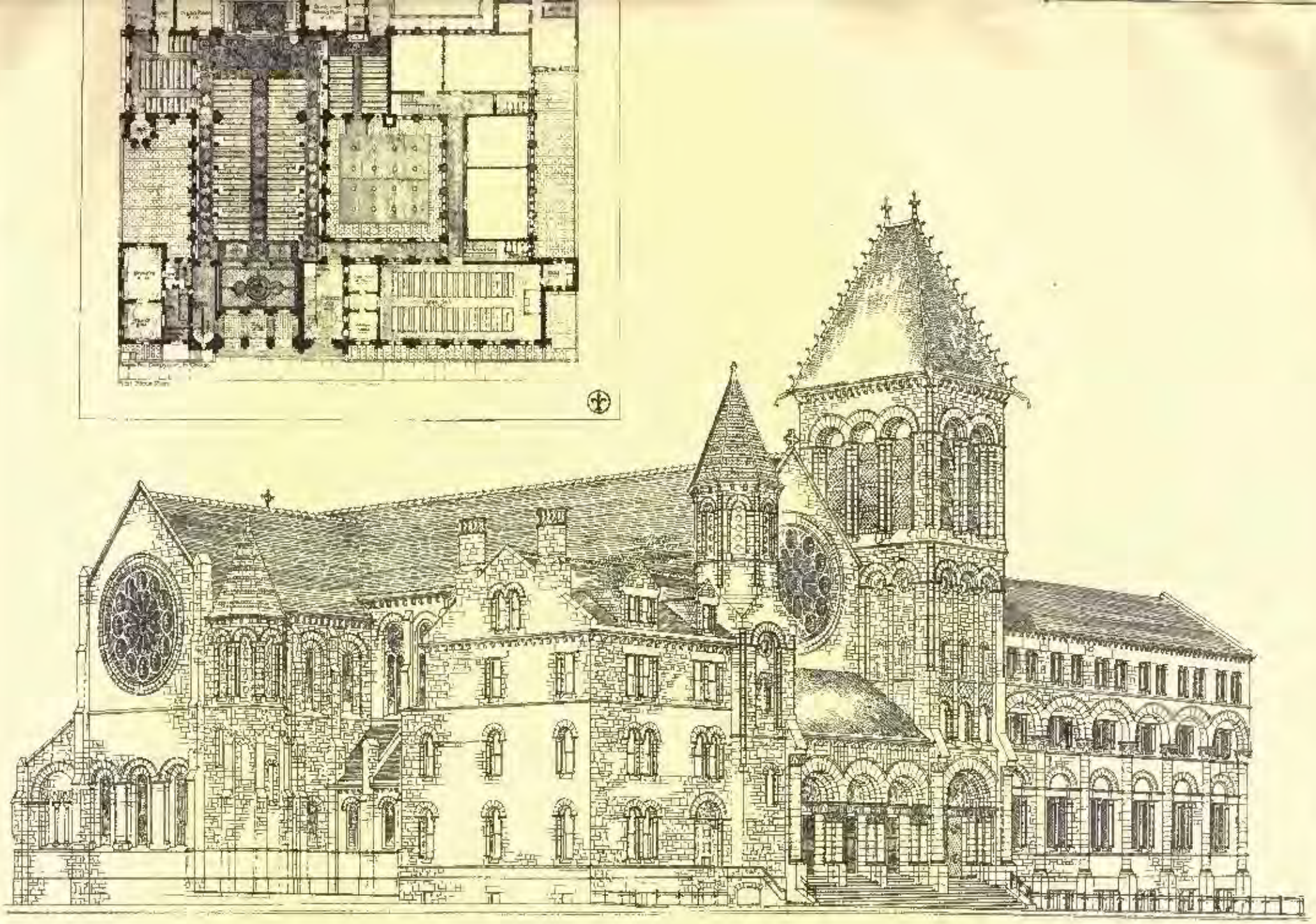
ST. PETER'S EPISCOPAL CHURCH, ALBANY, N. Y.

R. M. UPJOHN, Architect.



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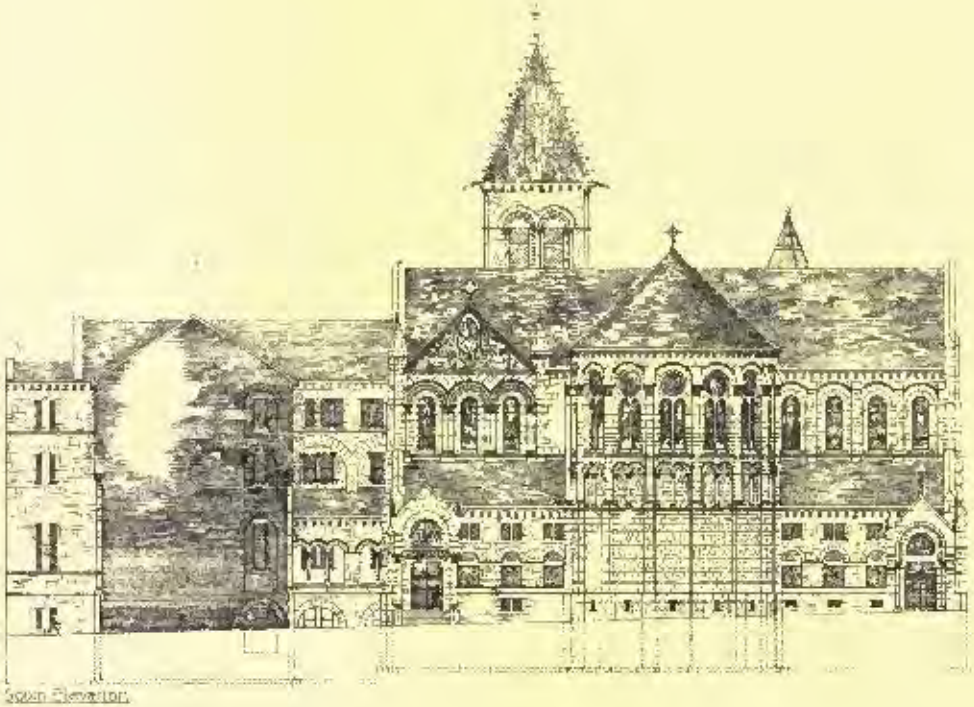
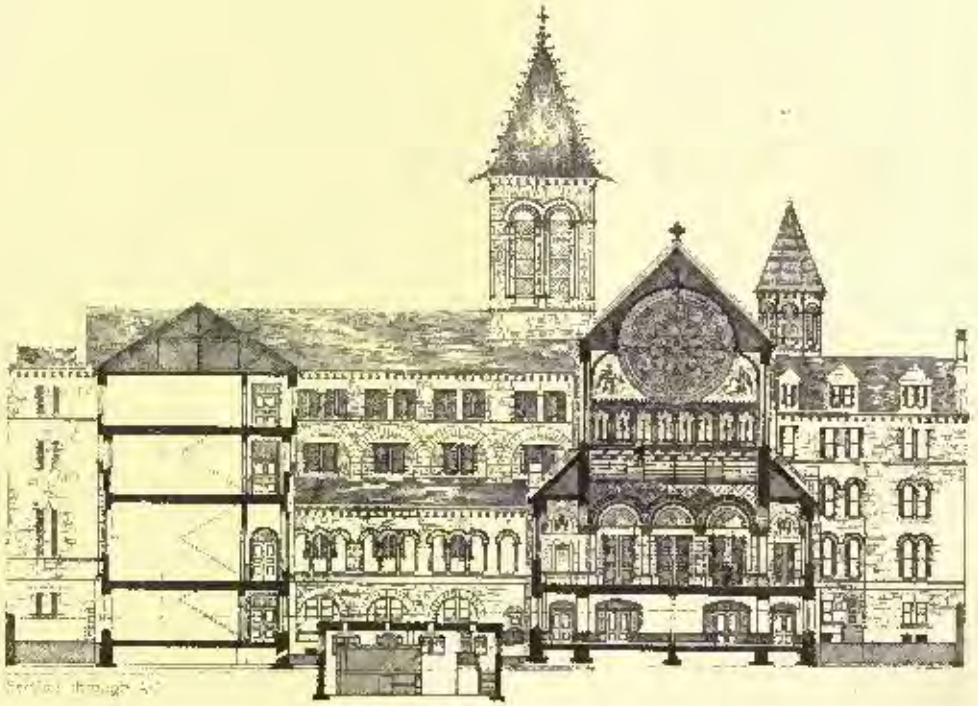


Sixth Elevation



Section through A.C.

COMPETIVE DESIGN
FOR CHURCH,
CLERGY HOUSE AND SCHOOLS
FOR
TRINITY CORPORATION, NEW YORK, N.Y.
R. M. HUNT, ARCHT.

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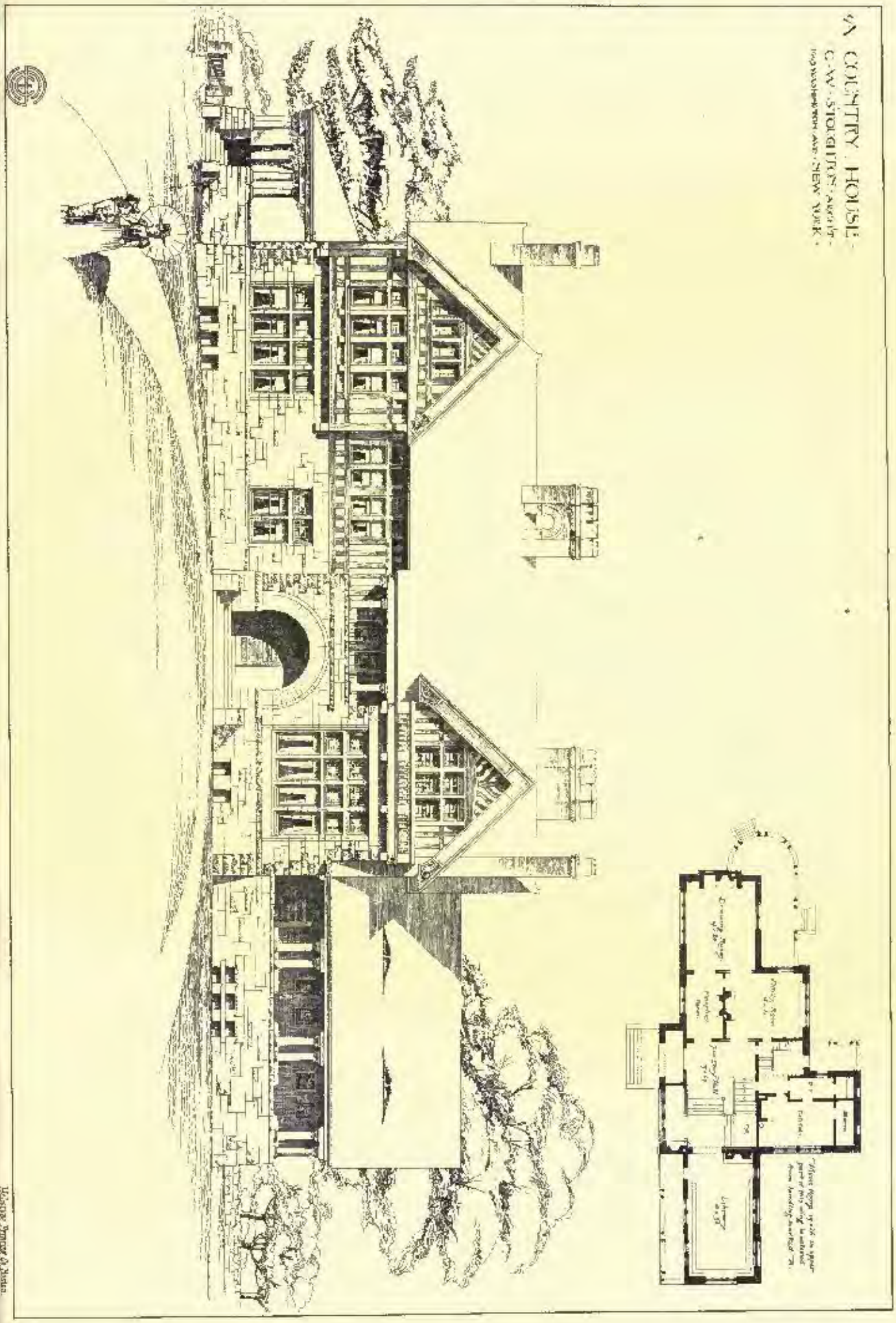

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and drying, it is slowly produced and its maximum effect does not become active for two or three years. The most tenacious lumps of earth crack and crumble under the alternative presence of air and water. Water drains away little by little and air takes its place. Furthermore, this air with its oxygen also enters the soil from below, reaching it through the drains and escaping at their joints. This action is most important, and is generally not understood by agriculturists. It is one of the principal agents of fertility. As Barral has proved, the oxygen of the air penetrating the humus of the soil in all directions comes into contact with all of the organic matters of the surface-layer, unites with their carbon and forms an enormous quantity of carbonic acid. This is effective in breaking-up the adhesion of particles of clay which have been puddled together; it serves at the same time to dissolve the phosphates, carbonates, oxides, sulphates, etc., and place them in a condition favorable for absorption by the roots of plants. We understand from this the reason of the enormous influence that the application of drainage to broad areas has exerted on public health. It explains the marvellous results that we have just cited, results obtained in England, and especially in Scotland, and which have led Graves to this conclusion: "The extinction of intermittent fever is the most striking, and most eloquent of all the modifications caused by drainage."

GEORGE E. WARING, JR.

[To be continued.]

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

ST. PETER'S EPISCOPAL CHURCH, ALBANY, N. Y. MR. R. M. UPJOHN, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print, issued only with the Imperial Edition.]

KING MEMORIAL DECORATION, ST. PAUL'S CHURCH, AUGUSTA, GA. DESIGNED BY MR. F. S. LAMB, NEW YORK, N. Y.

THIS occupies the entire west end of St. Paul's Church, Augusta, Ga. The important feature of the composition is the central figure of St. Paul, heroic size, flanked on either side by life-size figures of the four Evangelists. The color scheme is very rich, and in connection with the oak is pronounced a decided success. The work was executed by Messrs. J. & R. Lamb of New York.

VIEWS IN VERONA, ITALY.

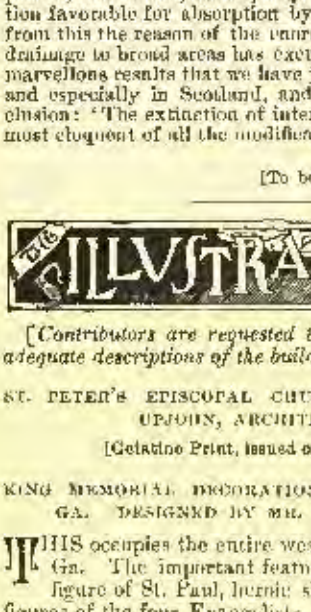
See article elsewhere in this issue.

COMPETITIVE DESIGN FOR CHURCH, CLERGY-HOUSE AND SCHOOLS FOR TRINITY CORPORATION, NEW YORK, N. Y. MR. R. M. HUNT, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A COUNTRY HOUSE. MR. C. W. STOUGHTON, ARCHITECT, NEW YORK, N. Y.

ITALIAN CITIES.[1]—VII.

VERONA.—II.



HAVING contemplated the tomb of the Scaligers, a visit must be made to the Arena, which, after the Colosseum at Rome and the Amphitheatre at Nimes is the finest and most complete monument of its kind which remains to us from Roman antiquity, only here the æsthetic effect is spoiled by the painful feeling awakened by the historic recollections which attach to these ruins. It is a feeling from which one never escapes when he finds himself in the presence of the ruins of Roman grandeur, which, under an imposing exterior conceal grievous memories: the temple evokes the image of human sacrifices which have too often soiled the altars of pagan worship; the triumphal arch recalls people who perished under Roman conquests; Etruria, cradle of the arts, trampled upon by the feet of the legionary, who did not even spare Greece, whose devastation achieved later by the vengeance of the troopers of the Venetian republic was first begun by the Roman cohorts; the circus recalls for us those spectacles of carnage consummated to amuse the crowd eager for blood. Everywhere murder, drama, massacre; everywhere man sacrificed to give pleasure to man, a human life offered up to gratify a crowd of other human beings. The arena at Verona is so well preserved that even to-day spectacles can be held there. At the time of the triumphal entry of Victor Emmanuel the city held a fête there, at which more than forty thousand persons were present — it formerly could contain more than sixty thousand. On the outside it measures 150 metres in length by 125 in breadth. The area reserved to combatants was 75 metres long and 45 wide. The amphitheatre contained 45 ranges of seats, which are still perfectly preserved. At the two extremities of the ellipse there were two large doors, below which run platforms or tribunes enclosed by balustrades. The exterior of the building is pierced by doors of exit and corridors which serve to facilitate circulation and the departure of the spectators. The doors are of the Doric order, and some of them still bear above the lintel a number in Roman figures, which probably served to indicate the class of people for whom these different sections and benches were reserved. It is generally believed that this arena was built in the reign of Domitian or Nerva, and that the architect was Lucius Vitruvius Cerda, who likewise built the arch of Gavi. It is also said that it was on beholding this strange and terrible edifice that Dante conceived his idea of the circles of the nether hell; but this is only a supposition, it is confirmed by no historic document.

Verona still preserves several other remains of Roman antiquity — rare things in northern Italy, amongst others the Porta dei Borsari, which crosses the whole breadth of the Corso, and is composed of two arches surmounted by two tiers of round-arched windows. Each arch is framed with Corinthian columns supporting pediments with dentils like the larmiers of the Doric entablature. It is easy to see that it is a work of a debased period, and its destination would be very hard to determine from its appearance, if an inscription, still preserved, did not inform us that these two doors were restored by Emperor Gallienus, A. D. 265. From the general appearance of the structure, we can conjecture that they were actually built under the Antonines.

At the commencement of the Via dei Leoni is found an arch of the same name, which, although less well-preserved, has a more striking air. To-day it is not certainly known what was the character of this monument, and for a long time the question was debated whether it was an entrance to the forum or a triumphal arch. These two hypotheses are inadmissible. The Romans gave their triumphal arches a bolder and more imposing aspect. As to forums, they were usually approached by an entrance whose monumental decoration never gave to these places of meeting the appearance of an enclosed space. I am rather inclined to believe that the Arca dei Leoni was anciently one of the city gates, and that its age dates beyond the reign of Titus.

The tombs of the Scaligers form perhaps the most curious monument which Verona possesses, and it may be considered unique of its kind; but the very numerous churches are still worthy of study, for these, comprised between the epoch which reaches from the sixth to the fourteenth century, offer every variety of the Lombard style, and more than in any other city of Italy allow us to take notice of the fashion in which this style was formed and transformed, to be subsequently absolutely swallowed up by the Italian style. San Lorenzo, which dates from the fifth century has lost in part its historic value, because it was restored four centuries later by order of the Arch-deacon Pacifique; but the interior, which has three naves, is supported by columns, whose dimensions and sections are very remarkable, and which, by their heavy and stunted form, give us precisely the idea of an art which still lacks dash, and which has not yet known how to raise itself above the vulgar means of architectural construction. Santa Maria in Organo is a more perfect building and more boldly conceived. Unfortunately it, too, has been restored by the Lombard kings of the seventh century and by succeeding bishops; and in the last place the façade has been rebuilt by San Michéli, a Veronese architect, whose work is certainly remarkable, although it has the great misfortune of being attached to a monument which we would much rather have retain its original character. The interior decoration is extremely interesting. The choir is painted by Paolo Farinato, and the stalls are composed of curious pictures in inlaid woods, executed by Fra Giovanni, one of the Olivetan monks. Formerly there was shown in this church the ass which carried our Lord Jesus Christ to Jerusalem; but little by little the monks thought they perceived that visitors turned in derision from this relic, whose authenticity appeared to them very doubtful, and they finally shut it up in a closet of the sacristy from which it at length disappeared.

The Church of San Zeno gives us a nearly complete type of the Lombard Church. It is composed, as were the ancient basilicas, of a small structure superimposed upon a larger one, so that the interior has three naves, the central one of which is more lofty than the lateral ones, and the façade is divided into two stories, the lowest of which goes with the gable of the structure which serves for the base of the edifice, while the upper story projects in the centre and rises to the pediment which crowns it, and is surmounted by a cross. The superb square tower which stands a short distance off, and which finishes in crenellations in Ghibelline form, formerly was a portion of the residence of the kings of Italy. The first story is cut at half its height by a range of elongated and coupled windows, and the single doorway which opens in the centre of the design declares itself under a full-centred arch projecting from the main wall and supported by two columns which rest on two crouching lions, and bear on their Corinthian capitals equally couchant figures

[1] Continued from No. 636, page 204.

which receive the feet of the arch. The panels which flank the columns and the void of the tympanum are enriched with sculptures in relief, very roughly sketched out, and reproducing very bizarre subjects; amongst others we see a huntsman on horseback, who is accosted by the devil. People have taken great trouble in times past to decipher the significance of this allegory, and President Des Brosses, who had a mania for solving everything, believed that the sculpture was intended to represent a tradition of the times depicting a certain king, who, having no luck in his hunt, made a compact with the devil for the sake of obtaining a full game-bag; but modern criticism has discovered that the huntsman quite naturally represents King Theodoric, who in his quality of Notary of Arius was conceived as travelling in company with the demon Heresy. The allegory which represents two cocks which have seized a fox, which also figures amongst the sculptures, has always remained a riddle. The three interior naves are separated and sustained by alternate pillars and columns whose capitals of barbaric form are enveloped in leafage, lions, dogs and serpents. In the choir can be seen the statue of St. Zeno, who was bishop of Verona in 362. This is a polychromatic statue of grotesque style which represents the bishop holding his cross in one hand, while with the other he holds a line from which dangles a silver fish, for St. Zeno was the patron saint of fishermen. In the subterranean portion of the church, supported by a forest of columns, is the baptistery, of prodigious dimensions and constructed, as the story goes, of a single piece of hollowed stone. The story used to be that a holy-water font placed near by had been brought there by the devil in person, who had gone in search of it to Istria at the order of St. Zeno. In short, this church, begun by Pepin, son of Charlemagne, and restored by Otto I of Germany, belongs almost entirely as to its *ensemble* to the twelfth century. The sculptures which frame the principal doorway are perhaps the most barbaric in all Italy, if we except those at Pisa. Jesus Christ, the saints, and angels are shown in grotesque attitudes, with misshapen limbs and monstrous heads. They are really unpleasant, disproportioned caricatures. One would say that the sculptor wished to turn the evangels to ridicule. Art was at the lowest depth of its degradation, and while architecture was already taking on just and grave forms in default of elegance the secondary arts crept on hands and knees in infantile feebleness. It is well to remark that in Italy as in Greece and Rome it was architecture which first broke the mould of barbarism and disclosed to art more vast horizons, and that it is following the impulse and example of architects that painters and sculptors perfected themselves in their turn. In proportion as the edifice acquired polish and finish, the accessories were also forced to bring themselves into harmony with it; but it was always the architect who took the first step, and in all Italian monuments, at Verona, as well as at Sienna, Pisa, Florence, Orvieto, and everywhere, we can still discover evidence that the sculpture and painting always lagged behind architecture, and the frescos, the statues, the bas-reliefs, destined to decorate the monument, are always inferior to the monument itself.

The cathedral which, although in the first place built, about the tenth century, out of the ruins of the Temple of Minerva, really dates from the end of the tenth century — the epoch at which it was rebuilt — already begins to present a little more complete type of the Lombard style, which is a mixture, as we have said, of Gothic lightly tinctured with Byzantine. The façade is very harmonious, although still a little cold. The two superposed gables are well connected and complete one another really agreeably. The decoration is richer than that which we see on the façades of an earlier date, although in its entirety it still preserves that aspect of bareness proper to those periods when architecture is not yet in possession of all the resources which can enrich its creations, and is still constrained to exert all its energy in order to make sure of equilibrium and stability. The portico, whose apex reaches to the height of the rose window which punctures the centre of the design, is supported by two twisted columns planted on griffins. Inside the Gothic character is more prominent, although here, also, the mixture of styles is very visible, especially toward the choir, built by San Micheli who, indeed, had all the good qualities and all the defects of the sixteenth century, and by whom the choir was connected with the central nave by a belt of Ionic columns. Nevertheless, in spite of this jumble, the impression which one experiences is soothing and satisfying. This is why I do not agree with M. Taine, who said apropos of this cathedral that bands, arches and enrichments are alone able to give a church mystic sublimity, and that when these accessories are wanting the temple is not a Christian one. That which imprints upon a church the Christian character is in the first place the degree of Christianity practised by those who frequent it: I have seen in the country in the hidden valleys of the Alps little chapels composed of walls simply whitewashed, which on Sunday at the moment when the crowd, possessed with fervor while the priest officiates at the altar, have an aspect much more serious and inspiring than the vast basilicas where Gothic art has displayed all its luxuriousness of enrichment.

As to that which concerns style, I have already expressed my modest opinion when speaking of the Cathedral at Milan, that that which is called respect for purity of style is only proper to an age of feebleness. The artist who has imagination and genius is forced to create and break the consecrated formulas. Style is a barrier to which only spirits lacking in fire and dash can accommodate themselves, while all the great inventions in the domain of art have been made in defiance of accepted forms. Art is eternal and indefinite, consequently it must progress by innovation. When it ceases making innovations it falls into a period of decadence. Men who work after a determined style only copy. This is so true that there is no fixed manner in which one can award honor to an artist of genius. The great masters have constantly modified their talent during the course of their careers. Is there, for instance, a Michael Angelesque style? Raphael, also, although he died very young, submitted his genius to continual variations, and those who have seen, for instance, the "Transfiguration" have some trouble in believing that it was conceived by the same Raphael who painted the "Stanze."

In architecture there is perhaps more fixedness, for here the domain of invention is circumscribed by the unity of a design. The architect can only trace lines, and it is in disposing his curves and right lines in a certain manner that he succeeds in creating a *chef-d'œuvre*, but if he happens to achieve an original thing with such slight resources his merit is only greater. This is why it is necessary to accept with much reticence the scholastic traditions which attribute certain elements of architecture to one style rather than to another. It is agreed, for instance, that the pointed arch belongs in itself to the Gothic style, and there has been much discussion in times past to determine whether it was the Goths or the Arabs who invented it. Now, it is enough to know the principal data of Cyclopean or Pelasgian structure to be convinced that the pointed arch was an architectural form to which architecture would be inevitably conducted with or without the Goths or the Arabs, and that with the full-centred vault it was called to constitute one of the principal elements of solidity and embellishment. The door of the gallery of Tiryns, for instance, was formed by two jambs upon which are supported two rows of stones disposed as a triangle, and in like manner over the door of the treasury of Atreus at Mycenæ we see a triangular opening upon which rests the weight of the edifice. Now when the triangular form was discovered, the reign of the pointed arch was inevitable, and these were made, as we see, long before the Arabs or the Goths had any architecture. As to unity of style, about which the pedants make so much noise, I will remark once for all that the Greeks, who have remained our masters in the art of constructing fine monuments, paid little heed to it. In the Sanctuary of Athena at Tegeum, restored by Scopas, the portal was of the Ionic order, and in the cella a Corinthian order was superimposed upon a Doric order. In the temple at Bassæ in Phigalia a column of the Corinthian order was placed before the statue of Apollo, although the interior of the naos was supported on each side by five Ionic columns. The Philippeion at Olympia was decorated inside with Corinthian columns, which did not hinder its being flanked on the outside with Ionic columns. The pediments of the temples containing the treasures at Olympia were half Ionic and half Doric. At the beginning of the fourth century before Christ, the three orders of architecture were introduced in the temple of Athena at Tegeum, restored by Scopas, as already stated. Finally, in the Propylæa at Athens the Doric and Ionic orders alternated, as we see at the temple of Athena Apteros and the Erechtheum. Finally in this same acropolis, which is still the greatest and most perfect architectural work which human genius has yet produced, we see on the face of the Erechtheum which looks toward the Parthenon a superb specimen of the caryatid order, composed of a range of statues bearing upon their heads for capital the moulded cushions which support the entablature. We place these instances of promiscuousness before those wise men who cite Greece as an example of the grandeur which art can achieve by unity and purity of style.

This is wandering some distance from the churches at Verona. It is time we retraced our steps.

H. Merlin.

[To be continued.]

Time Measurement.—The *American Analyst* has this: "Why is our hour divided into sixty minutes, each minute into sixty seconds, etc.? Simply and solely because in Babylon there existed, by the side of the decimal system of notation, another system, the sexagesimal, which counted by sixties. Why that number should have been chosen is clear enough, and it speaks well for the practical sense of those ancient Babylonian mercliants. There is no number which has so many divisors as sixty. The Babylonians divided the sun's daily journey into twenty-four parasangs, or 720 stadia. Each parasang, or hour, was subdivided into sixty minutes. A parasang is about a German mile, and Babylonian astronomers compared the progress made by the sun during one hour, at the time of the equinox to the progress made by a good walker during the same time, both accomplishing one parasang. The whole course of the sun during the fourteen equinoctial hours was fixed at twenty-four parasangs, or 720 stadia or 360 degrees. The system was handed on to the Greeks, and Hipparchus, the great Greek philosopher, who lived about 150 B. C., introduced the Babylonian hour into Europe. Ptolemy, who wrote about 150 A. D., and whose name still lives in that of the Ptolemaic system of astronomy, gave still wider currency to the Babylonian way of reckoning time. It was carried along on the quiet stream of traditional knowledge through the Middle Ages, and, strange to say, it sailed down safely over the Niagara of the French Revolution. For the French, when revolutionizing weights, measures, coins and dates, and subjecting all to the decimal system of reckoning, were induced by some unexplained motive to respect our clocks and watches, and allowed our dials to remain sexagesimal — that is, Babylonian — each hour consisting of sixty minutes. Here we see the wonderful coherence of the world, and how what we call knowledge is the result of an unbroken tradition, of a teaching descending from father to son."

AUGUSTE RODIN.[1]—VIII.

THE DOOR.

Figure from the Door. Auguste Rodin, Sculptor.

TO assist to a more classified understanding of the scene on the door, it may be separated into three time divisions of subject:

(1) Those who have just arrived, and express in their actions fear, horror, indifference, or mute surprise. Some stand erect, others roll themselves together like a ball, in concentric agony, and others still, grasp a foot or leg in utter desperation, as though that member was the cause of or could ameliorate their woe.

(2) Those who seek, in all the haste of wild and unguided eagerness, the friends that have preceded them. They rush through every nook and corner, over rock and under sea, blindly feeling, falling and crawling after some never-to-be-forgotten loved one. The pathos exhibited by some of these beings is touching beyond measure. Eyes filled with ever-flowing tears, and cheeks cast in everlasting agony. Not all the pains of Hell can quench this angelic sentiment.

(3) Those phantoms who have become accustomed to the place. Of these, some are continually affected by their surroundings, while others vainly and persistently grope around in the attempt to re-enact their lives on earth. Here and there is seen an isolated spirit, like the kneeling harpy, who, perched on the point of a projecting rock, peers down, with the most impertinent curiosity, into the whirling circles below her. Another, a robust figure of a man, throws his arms around his body, as if to hold himself from bursting with indignation at the awful sights which meet his protesting eyes. A third, raises his head and hands upwards in cursing reproof of the punishment of faults for which those who committed them were not responsible.

In some retired spot a majestic shadow stands in quiet contemplation of a flock of delightful little male figures, who flit about and come and go, like so many fairies, as careless of their surroundings as though they came with a breath, and on a breath would go. The grave old being that sits with his legs well apart and rests his hands on his knees, represents a man turning into a tree. On the door his back is towards the observer, and while going through this peacefully transforming process, he contentedly views the agitated panorama that stretches out in an endless vista before him. Near by, a hideous female monster has caught, within the slimy meshes of her serpent arms and legs, a gay and handsome youth, whom she presses to her breasts with an evidently mutual satisfaction.

The predominant emotion expressed on the door is that of love, in all of its unnumbered degrees, phases and characteristics, and by every kind and degree of humanity, both high and low. Some of its expressions find here their appropriate environment, while others evidence, in their every breath, that where love is there is Heaven. If sweet submission and helplessness had any effect in softening punishment, the very rocks themselves would melt in pity and forgiveness before the appealing forms of the female spirits with which the sculptor has blossomed his inferno. Perhaps he means to suggest that Heaven and Hell are individual rather than collective localities, and that no place, however dreary, is unblessed by the presence of woman's highest claim to mercy.

The sculpture of the pilasters of the door is in low relief, and treated with extraordinary reach of line. As pieces of color they are almost beyond praise. The one on the right of the door represents souls in limbo, and is composed of figures of all ages and sexes who have sinned in ignorance. The sculptor chose to treat this preliminary region in order that he might introduce infants and children, and thus give greater variety of form and interest to the art-effect. And here are scenes of the most touching dramatic interest. Half-awakened mothers pressing their long-lost infants to their emaciated and milkless breasts; children, in sweetest innocence, calling in vain for some affectionate recognition from the now insensible, but once loving arms of their parents, and aged souls gathering to themselves in tender and comforting embrace some young and saddened spirit.

The other pilaster illustrates the circle of love, and has for its principal subject the group of "Paolo and Francesca," already described. It is placed at the top, with the back of the lover towards the observer, thus emphasizing, like a crowning capital, this saddest of all heart tragedies.

[1] All rights reserved. Continued from page 225, No. 626.

The moulded exterior sides of the frame of the door, running back from the pilasters to its surface-line, are also decorated with figures, "Flowers of Evil," in low, high and full relief. All arranged with surprising grace and masterly sense of decoration.

Rodin is a great admirer of Gothic sculpture, and it has often been affirmed, because of his piercing way of seeing and reproducing Nature, that he was an ancient Gothic artist come to life again; or a guardian-spirit sent back by that secret and jealous guild to watch over the sacred structures set up by them on their journey through this sublunary sphere. Certain it is that the delicate and cunning way in which the figures have been placed on the sides of the door gives no little weight to this interpretation of the sculptor's origin.

With this, as with all the finer Gothic decoration, there is an inseparable connection between it and its background.

The high-relief group of "Mother and Child," occupies a small panel above one pilaster, while its corresponding panel is filled by two young female forms embracing each other. The illustrations of a few of the sketches of groups and figures of the door can give but a faint impression of what it comprises. Many of them are so intricate in composition that they are impossible to render except by outline. In very fact they are not subjects for illustration on paper, but are combinations of forms only to be fully seen in their proper places.

If the variety of individual action and general movement on the entire structure is endless, so is the world of emotion expressed indescribable. Each and every figure is as logically composed as the passions they represent are vibrating and individual. To attempt to give any satisfactory idea of it would be like trying to delineate the inner life of him who had the sublime audacity to cut in twain the infernal regions, and reveal to mortal eyes the denizens thereof in living fact and form.

The writer knows of nothing in art that can compare with the door. It is for pilgrimages.

Of the character of the design, in comparison with that of Ghiberti, it must be said that it is more original and more varied. Over all the figures, conscious or unconscious, there is spread a veil of mystery, a sense of waking from a long sleep. It is another world.

While formulating the scheme of the door, or living through the life of shadows that inhabit it, other subjects of a kindred nature presented themselves to the mind of the artist, and none more forcibly than those suggested by the poems of Baudelaire, between whom and Dante there is, in the judgment of Rodin, much community of spirit. Between the two he ran riot with the creative source that flowed in upon him, and from the ends of his bewitched fingers there went out a great multitude. One idea inspired by the French poet is represented in the figure of "Sorrow," a young girl pressed down by a weight upon her shoulder, and as difficult to represent, by any process, as the Syren group. Nor does any single view tell its whole story, for each profile gives a new and unexpected grace. This supple little creature, not more than eighteen inches high, is regarded by the sculptor and his friends as one of his very best compositions, and many copies of it have been made for the latter in both marble and bronze. Its commercial success was cut short at the beginning, for the first duplicate was ordered by an art-dealer, who, after it was completed, decided that he did not like it. Another plaster illustrates the thought contained in two verses of Baudelaire's poem, "The Death of the Artists," which reads as follows:

> "There are those who have never known their idol,
> Those sculptors, cursed and marked by a stigma,
> That forever beats their breast and forehead,
> They have one hope, strange and dark Ending!
> That Death, flowering like a new sun,
> Will blossom the flowers of their souls!"

The group is composed of two figures, the poet, standing mournfully, with his left hand pressed against his forehead, while an unseen female form, full of the sweetest sympathy, appears at his back and extends her arms almost around, without touching him. Always near though never known.

OF RODIN'S BUSTS, STATUES AND SKETCHES.

The appreciations of the bronze mask of "The Broken Nose," given in a previous article, assume pretty fully all that need be said concerning it. It is an inevitable reminder of early antique sculpture, and it is doubtful if anything of its kind has been done since that period that so closely resembles it. Possibly a trifle dry, it is yet carried to an extreme of a great kind of modelling. It is the sum of modelling, as such, that the sculptor has ever done. And that it should be made by a youth of twenty-two! The little plaster bust of the priest Aymar, is also dry, though thoroughly studied as a form, and the nature of the subject preserved with inflexible tenacity.

These two pieces are all that the sculptor possesses of the first twenty-one years of the study of his art.

Of "The Age of Brass," essays could be written without doing overjustice to its merits, and the time will come when such caressing tasks will be more often pleasurably performed than now. Well may this unlegended bronze tempt the curiosity of the beholder to find out its meaning, and inspire the giver of names to search his mythological catalogue. For nomenclature is uncertain as the riddle of Omar Khayyám, and as reticent as a Hindoo idol.

Of Rodin's larger figures not one is so pure a work of art and

sculpture. Pure, because it is the strongest and most spontaneous expression of his nature, burdened with neither name nor outward purpose. The short history of its origin has already been told. Due to the urgency of a sentiment so complete that it formed itself, through the aching hand of the sculptor, into a sphinx, so silently dramatic that none have entered into its secret. It was the first of the sculptor's full statues seen by the writer, and it seemed to him the most living piece of sculpture, except the Greek, that he had ever seen. And he feels that there is no other way but to set it up as a household god, let loose the veins of admiration, and repeat with ever increasing pleasure the sense of elegance and firmness by which the noble Belgian soldier has been made immortal. Immortal, not only in the truthful transformation of his quivering flesh into bronze, but as a symbol of the workings of a poetic and mystic soul.

In conception "The St. John" is as complete as its purpose is evident. It seems an embodiment of the forerunners of all centuries, a personality that gives authority to history. It makes its own invisible audience, and creates its own atmosphere. The primitive propriety of its type, rude and ungainly, is a twin brother to its faithful reproduction. And it finishes, until a greater than Rodin shall come, the whole race of harbingers. It is greater than "The St. John" of Donatello, because it needs no accessory to indicate its identity. He that runs may read.

Of the type selected by Rodin to represent St. John there has been some criticism, because it was affirmed to be physically lower than that of Donatello. This criticism suggest some very interesting considerations: of the models of the present day, the different ways of reproducing them, and above all, upon what Rodin's style of sculpture is founded, and requires more space than can be given to those articles.

If "The Age of Brass" is the sculptor himself concealed in the figure of a young warrior waking from the half-sleep of unknown strength, in "The St. John" he is fully manifest as the matured chieftain heralding the coming of a new and reviving force in art. But from a truer point-of-view the latter has as little to do with any biblical purpose as the former with an historical period. Both, are, purely and simply, pieces of sculpture.

As "The Broken Nose" was readily taken as a reminder of the antique, so the "Torso," of the first sketch of "The St. John," would be accepted as a veritable specimen. To all intents and purposes it is, for it represents, so far as it goes, just as fine a note. It is really the half-way point towards the antique. The female figure entitled "Fragment," the "Back View of a Study of Vigolino," and the "Torso," are good specimens of a style of modelling invariably characteristic of certain moods of the sculptor, and what he regards as realistic sculpture.

"The Men of Calais," a sacrificial procession of corporeal apparitions, people the private studio of the sculptor, on the Boulevard de Vaugirard. They are still in plaster, a little over life-size, and not quite completed. The committee having this monument in charge desired only one statue, that of Eustache de St. Pierre, the principal personage in the memorable history of the siege of Calais, but the subject was too complete and inseparable in interest to be divided, and the sculptor, nobly appreciative of this dramatic whole, chose to make the effigies of all the heroes, for the price he was to receive for one.

And here they stand, six in all, clothed in long shirts, each with a rope around his neck, as ready to march into sculptured fame, as they were five centuries ago into the presence of a conquering king, and thence to the gibbet. The inhabitants of that town, reduced by famine to capitulate after eleven months of courageous defence, were summoned to deliver up to Edward III of England, six persons from among them upon whom he could satiate his vengeance. At this news the people broke out into wailing. "But then there uprose the richest citizen of the town, whom they called Mister Eustache de Saint Pierre, and he spoke thus before them: 'Great pity and great misfortune would it be to see such a people as this perish. I have so great a hope of having grace and pardon from our Lord if I die to save this people, that I wish to be the first, and I will place myself willingly at the mercy of the King of England.' When he had said those words the crowd was moved, men and women throwing themselves down at his feet, weeping. Then another citizen, who had two daughters, and was called Jean d'Aire, arose, and said he would accompany his friend Mistur Eustache. This noble example was followed by two brothers, named Wissant; lastly, two other citizens, whose names, some say have not been preserved. The whole six, with ropes around their necks, and bearing the keys of the town, were conducted by the governor, John de Vienne, to the English camp. Edward, on seeing them, called for the executioner; but the Queen and his son interceded for them and obtained their pardon." Each figure, according to its temperament, expresses a different emotion. One goes in humble submission, another in repressing rage, while St. Pierre, the most heroic of all, grasps with trembling desperation the ribbon upon which are strung the keys of Calais' gates, raises his head in contemptuous defiance, and stretches up like a proud saint, fit to face all the conquerors. None of these statues are god-like, but are intensely, and almost brutally human. Great, all the same, because they are men of their day, of to-day, and will be forever. Nor do they seem to feel for themselves as individuals, they go as a self-sacrificing answer against human cruelty, crying out like giants.

As statues they have the air and presence of Colossi. It is the same with many of the figures on the door, in a sense overriding the prevailing impression of numerical surrounding, or even of general composite purpose, and forcing the observer to regard them as Olympian beings, around which the tragedy of death and hell goes on as a momentary farce.

Rodin's Busts.

Since Rodin's return to Paris — 1877 — he has made busts of some of the most distinguished men in French literature, art, and public life. Beginning in 1881, with that of Jean Paul Laurens, and following with Legros, Hugo, Dalou, the sculptor, Antonin Proust, Rochefort and Henri Becque, and also those of Mesdames Roll and Morla.

The Laurens bust appears like an early tribal patriarch pushed out of oblivion by some resurrecting power, bearing upon his venerable form the dust and mold of forgotten ages.

Legros, a fiery sensibility harassed by antagonistic surroundings, his lineaments preserved in saving metal by an almost painful sympathy.

Hugo is an old god put together with the eagerness of a Titan, and fit to mark an epoch.

Dalou represents a class, the legend of which, is, "He faced sorrow and walked in loneliness." A bust, sent into posterity with a grip and fibre as determined as that of a conventual anchorite who preaches by his own life the abnegation of every human joy.

Of no bust that Rodin has made would there be as much curiosity to know what he could get out of it, as that of Rochefort. A cold-eyed, turbulent, civic cynic; a fiery "sagittary, whose shafts are already regathered into the store-house of yesterday." But the "bullets that the sculptor put on before, and took off after dinner," were the innocent outward semblances of a dissection, of which Rochefort had no conception, and which have translated him into a force in art and a permanent subject of history.

The marble bust of Madame Morla was exhibited in the *Salon* of 1888. Of over fifty newspapers notices, all regarded it, with four exceptions, as the best piece of sculpture there, and in nearly half of them, its author was referred to as the greatest sculptor of his time.

Leon Plée, in his report of the busts of the *Salon*, wrote as follows: ". . . they are beautiful, and yet we know of a very simple one, that is still more beautiful, it is the bust of a woman, by that great artist who is known as Rodin.

"We have never seen, even in the works of the Renaissance, such youthful lines or an equal suavity of contours. Those half-closed eyelids, the sweetly raised head, the young woman by Rodin seems to wake from some dream, some mysterious vision.

"Her adorably modelled bosom pushes back the gown of fur that oppresses it. Strange creature! one would say that she was escaping from her marble covering like a flower from its verdant envelope, as fresh, as pure, as virginal. It is the master-piece of Rodin, and perhaps the master-piece of the *Salon*."

This bust was the first work purchased by the State, at the *Salon*, for the Luxembourg gallery, for the sum of eight hundred dollars. Exquisitely charming as it is, the sculptor does not regard it as a fully satisfactory reproduction of his model, because it bears too much the impress of the character of the superior marble cutter that executed it. Rodin understands the fine fact, that just in proportion that a marble workman excels in his trade does he unconsciously give his work his own interpretation of the model which he copies. And this, in spite of the most exacting means of mechanical measurement that he may employ. With a sensitive sculptor this is precisely what is not wanted, and the only way that he can insure the exact reproduction of his model in marble is to do the work himself. But this method is practically impossible, because he cannot afford to do it for the prices he receives. To escape this unfortunate condition of things, Rodin, like all good sculptors, prefers bronze reproductions of his models, and by the wax process. In this way his work is not changed by any intermediate hand in its transformation from one material to another. The color of bronze is also a matter to which the sculptor gives the most tasteful attention. When possible, he casts his models in silver.

The unfinished condition of the busts of the Laurens and Morla busts, have been the subject of considerable critical comment, though one or two writers have suggested that none knew, so well as Rodin, how to make a crude and unfinished piece of marble appear like a work of art. Nor does any one know better than he that certain heads, when made into sculpture, cannot be treated as isolated divisions of the human body but must have, as a necessity of their proper expression, some accompanying intimacy of form, some warmth of accessory. In his treatment of these busts the sculptor has shown how well he understands this rarely demonstrated principle in the art of making busts, and of the individual requirements of his subjects. All is in harmony.

Another characteristic of the sculptor, is that of often stopping work on a figure the moment he has found, by general movement, the fundamental object he was seeking, and leaving the head, hands, and feet unfinished. And he gets so much life into this movement that the most fastidious art-lovers are glad to possess such unfinished work in bronze or marble. Rodin seems to exult in reiterating, in this way, the facts of primitive sculpture.

Physiognomical details are also often neglected by him, the pose of the head telling the whole story. He seeks the great germinal principles first, illustrating the old saying that the slightest touch of a master produces art.

In his busts Rodin makes men greater than they are, he hides himself in their personality. They have the authority of types, and thus become the property of mankind. T. H. BARTLETT.

(To be continued.)

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

LICENSING ARCHITECTS IN TEXAS.

DALLAS, TEXAS, MAY 16, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The leading article in the *American Architect and Building News* in the issue of the 4th of May, in reference to the Bill to regulate the Practice of Architecture in the State of Texas, was apparently written without properly studying the subject. You say: "It has been suggested in other States that persons practising without a certificate should be denied the assistance of the courts in collecting payment for their services. If any such rule has been adopted in Texas, it will be best for architects from outside, however well qualified, to be cautious in accepting commissions for which they may never be able to collect their pay," etc.

No such suggestions as the above have ever been made in the bill, and you cast a slur and make a strong and deep cut at the rules and regulations of the Association of Architects, unwittingly, perhaps, but certainly in an injudicious and unkind manner. If other State Associations have erred in putting a premium upon dishonesty on the part of proprietors or clients, Texas has not recourse to such measures, and offers no hindrances at all to competing architects from other States; in fact, it entitles them to the highest considerations at the hands of the Association and building public.

The bill, as formulated, was favorably received by the Committee, unanimously recommended and introduced in the House, but, owing to pressure of business, was never called. Hence the architects of the State have not the law and protection you credit them with.

Enclosed please find the full text of the bill as presented to the Legislature of the State of Texas, and make such corrections in your next issue as may put the Texas State Association of Architects in the proper light. Yours truly,

GEORGE W. STEWART, M. T. S. A. A.

[WE are only too happy to set this matter right, and to express our satisfaction with the draft of the bill, which bears marks of the considerateness and common-sense which the Texas State Association of Architects has previously shown in regard to other matters. The only regret we have is that the authentic information now furnished us was not sent us before, instead of after, we found in the daily papers the paragraph on which our comments were based. Mr. Stewart does not, perhaps, reflect that after a statement, not obviously absurd, has been disseminated all over the world by the Associated Press, it is too late to spend time in "properly studying" it, and we must usually make our remarks upon it when it comes to us, and as it comes to us, or expose ourselves to the reproach of publishing only the most antiquated news. As to the denial of the assistance of the courts in collecting bills for the services of unlicensed architects, we cannot find that we made any assertion whatever about the Texas bill, in regard to which we did not pretend to have any information, but contented ourselves with mentioning what had been proposed in other States, with a suggestion that it would be well for architects who intended to practice in States in which they were subject to a special statute to find out what that statute was before they incurred any risk of loss from its operation. Under the bill as proposed, which will, we should judge, be enacted at the next session of the legislature, foreign architects who practice within the State without a license, unless they visit the State for the purpose of engaging in competition, are liable to a fine of not less than one hundred or more than five hundred dollars. Even this information will be interesting to a good many of our readers, and, while we repeat that the Texas Association seems to have drawn up its measure with the utmost moderation and regard for professional courtesy towards their brethren outside the State, we should have been glad if they had realized how highly their brethren would have appreciated the early and exact information on the subject which they alone could give.—EDS. AMERICAN ARCHITECT.]

A BILL TO BE ENTITLED AN ACT TO REGULATE THE PRACTICE OF ARCHITECTURE.

SECTION 1. *Be it enacted by the Legislature of the State of Texas:* That hereafter no person shall pursue the business or profession of architecture in this State except in accordance with the rules and regulations herein prescribed.

SEC. 2. Within thirty days after this act takes effect, it shall be the duty of the Governor to appoint and commission a Board of Architects, to consist of three professional architects, each of whom shall be a citizen of the State and shall have practised the profession of architecture for at least the period of seven years. The members of said Board shall hold their offices for the term of two years, and until their successors are appointed and qualified; but no member of said Board shall receive any compensation for his services, nor shall the expenses of said Board become a charge against the State. After the first appointments of said Board, all subsequent appointments shall be made only from licensed architects within this State.

SEC. 3. Said Board shall be styled the "Board of Architects of the State of Texas." They shall keep a record of all their proceedings and such records are hereby declared to be public records. The presiding officer of the Board shall be *ex-officio* the custodian of such records; and copies of such records certified by the presiding officer of the Board and attested with the seal of the Board shall be admissible in evidence in all of the courts of this State, and in all cases, civil and criminal, without further authentication. The seal of the Board shall consist of a Texas star with the words "Board of Architects" around the margin.

SEC. 4. Within thirty days after their appointment, the members of said Board shall meet at the Capitol and organize by a selection of one of their number as presiding officer, and they may appoint one of their number to act as Secretary of the Board. When organized, the Board shall have the power to administer oaths and to take testimony upon all matters properly within their cognizance. Said Board shall meet regularly at the Capitol of the State once in every six months, at such times as may be designated in the minutes of the Board, and at such other times and places as the presiding officer may designate, who is hereby vested with authority to call special meetings of the Board for the transaction of any business properly within their cognizance. Notice of all special meetings of the Board shall be given by publication in some newspaper published in the city of Austin for five consecutive days before such meeting, and in case it is known to the presiding officer that other persons may have an interest in such meeting, he shall also notify such persons by due course of mail.

SEC. 5. No person shall practise the profession or pursue the business of an architect without a license from the Board of Architects. Any person desiring to pursue such occupation shall apply to said Board for license, and thereupon the Board, at some regular or special meeting, shall proceed to examine the applicant as to his qualifications, and with special reference to the proper construction of buildings, the strength of materials, the laws of sanitation as applied to buildings, and the ability of the applicant to make practical application of such knowledge in the ordinary professional work of the architect. If such examination is satisfactory to a majority of the Board, a license shall issue to the applicant, under the seal of the Board, authorizing him to practise the profession of architecture within the limits of this State. All members of the Texas State Association of Architects shall be entitled to license without examination.

SEC. 6. All licenses shall be subject to revocation by the Board of Architects, for gross ignorance, negligence, recklessness or dishonest practices; but before any license shall be revoked the holder thereof shall be entitled to at least ten days notice of the time and place for the hearing of the accusation against him, and shall be informed of the nature of such accusation. He shall also be entitled to process for his witnesses, and to be heard by himself or his counsel, or both in open, public trial. And no license shall be revoked except by the unanimous vote of all the members of the Board.

SEC. 7. If any person shall pursue the business or occupation of an architect in this State, without first obtaining a license therefor, in accordance with the provisions of this act, he shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than one hundred nor more than five hundred dollars. But nothing herein contained shall be construed to prevent any person in this State from planning or superising the erection of his own building; nor shall the provisions of this act apply to architects from other States who may desire to compete for some special building, public or private, and who may visit the State in person for such special purpose; nor shall it apply to students or employés of licensed architects within this State, acting for and by authority of such licensed architects.

SEC. 8. The fee for each license shall be ten dollars, which shall be paid to the Board of Architects upon delivery of the license, and the fund thus accrued may be expended by the Board for the payment of their travelling and other expenses. An itemized account shall be kept of such receipts and expenditures, which shall be reported to the Governor thirty days before the regular meeting of each legislature.

THE IOWA SOLDIERS' MONUMENT.

NEW YORK, May 8, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Would you kindly inform me if it has yet been decided which of the Iowa Soldiers' Monuments deserve the prizes. If a decision has been made, it would be of interest to the public, as well as to the profession, if you could give an illustration of the successful design. Respectfully,

FREDERICK H. STEWART.

[WE refer this question to our readers.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

PAPER FOR BUILDING.—In 1854 a hot-headed French inventor offered to contract for churches and cathedrals, including a peal of bells, says *The Paper Makers' Circular*, to be constructed entirely of paper. From chimes to cannons was but one step, and the Gallic inventor announced his readiness to supply a train of artillery of any given calibre, made of the same material. Building-paper is enjoying a perfect boom just now, and is proving a fine material in the hands of architects and builders for several uses, inside and out. The advantages, briefly stated, are: Continuity of surface, or its adaptability for making into rolls of almost any width and length, and flexibility; or by gluing several layers together it may be made stiff, and will stop the passage of air because of the absence of joints. Unlike wood, it has no grain, and will not split. It is unaffected by change of temperature, and thus has an advantage over sheet-metal for roofing materials. In the fourth place, though in its natural condition it is affected by moisture, it can be rendered waterproof by saturating with asphalte or by various other methods. Fifth, being a non-resonant body, it is well fitted to prevent the passage of sound. Finally, it is a non-conductor of heat, and can also be made of incombustible material like asbestos, or rendered resistant to fire by chemical treatment.

DOMESTIC ELECTRIC HEATING.—One of the electrical projects in the air at the present time, says the New York *Electrical Review*, is the problem of heating dwelling-houses electrically, without the use of any very hot substance. It is claimed that wall-paper can be made in such a way that the passage of currents of low electro-motive force will heat it moderately warm to the touch, and thus diffuse throughout the room an agreeable temperature. This is, of course, theoretically possible and may even become feasible in a more improved state of the art. A source of warmth coming from the entire surface of a room would certainly be the perfection of house-heating and would do much to make this so-called temperate zone of blizzard's sea blows endurable. Why may not the artificial illumination of the future be of the same nature? Recent developments are tending towards the possibility of infinite subdivision. The charm of a room illuminated with myriads of candles is one never to be forgotten, though it is one which few of the present generation have seen. We predict that the ultimate use of the glow-lamp for domestic purposes will be to diminish its size and increase its number.

India-rubber Pavement.—"I notice in the columns of several foreign engineering journals," said a Des Moines contractor to the editor of the *Iowa State Register*, "that for paving streets India-rubber threatens to enter into competition with asphalt. This new pavement is the invention of a Mr. Busse, of Leyden, Prussia, who has introduced it in Hanover. He used it first in the summer of 1887 for paving the Goethe bridge, which has a surface of 10,784 square feet. The new pavement proved so satisfactory that about 17,000 square feet of ordinary carriage-way was paved with it last summer. The Berlin corporation, being favorably impressed with the new pavement, has had a large area paved with it as an experiment. Perhaps this is the solution of necessity for a noiseless pavement to be used in the vicinity of court-houses, churches, schools and libraries, where the ear rolling over the stony street is an insupportable nuisance."

Soda Locomotives.—Four locomotives to be run by soda, which takes the place of fire under the boiler, have been built in Philadelphia. They are for service on the streets of Minneapolis, Minn., where steam engines are forbidden. The engine is about sixteen feet long, entirely boxed in, with no visible smoke-stack or pipes, as there is no exhaust or refuse. The boiler is of copper, eighty-four and one-half inches in diameter and fifteen feet long, having tubes running through it as in steam boilers. Inside the boiler will be placed five tons of soda, which, upon being dampened by a jet of steam, produces an intense heat. In about six hours the soda is thoroughly saturated, when the action ceases. A stream of superheated steam from a stationary boiler is then forced through the soda, which drives out the moisture, and the soda is ready for use again. The exhaust steam from the cylinders is used to saturate the soda, and by this means all refuse is used. These engines are the first of their kind that have been built in this country. They will have the same power as those used on the New York elevated roads. Soda engines are used in Berlin and other European cities very successfully, and they also traverse the St. Gothard tunnel, under the Alps where the steam engines cannot be used, because the tunnel cannot be ventilated so as to carry off the noxious gases generated by a locomotive.—*Railway Age.*

The Death Roll of the Forth Bridge.—A writer in the *Pall Mall Gazette* says that, including five drowning cases, the fatal accidents from all causes in connection with the Forth Bridge amount to 53. As regards those killed in the actual construction of the bridge, there have been 44 lives lost, death taking place either at the time of the accident or soon after. The total number of accidents which had occurred up to September, 1888—mostly in the four years beginning with September, 1884—was 545, of which the greater part, of course, were of the description ranging from "serious" to "slight." Of these 545 cases, 86 were treated in hospital, and 459 at the homes of the injured persons. The following hairbreadth escapes are recorded: One man trusted himself to work at a height of 120 feet over the waters of the Firth, simply grasping a rope. His hands got numbed with cold, his grasp relaxed, he fell backwards down, and down, into the water; and he was fished up alive. In another instance a spanner fell a distance of 300 feet, knocked off a man's cap and fell on the wooden stage at his feet, and went clean through a four-inch plank. In another case somewhat similar, a spanner which fell from a great height actually tore a man's clothes from his waistcoat to his ankle, and left him uninjured. One of the most thrilling incidents I heard of was that in which the "staging," or scaffolding on which the men work high up in mid-air, gave way, carrying a number of poor fellows in its fall. Two of these men, striking some portion of the work in their descent, were killed before they reached the water; one or two others who fell clear of the girders were rescued from the Firth little the worse for their fall and immersion. Two others, however, managed as they fell to grasp at one of the struts high up above the water, and there they clung for dear life. To effect their rescue was itself an undertaking of no slight danger. But efforts were promptly made, and before long the man who happened to be nearest the rescuer was reached. And this brave fellow, hanging there on the ironwork, actually persuaded the rescuers to delay taking him off before they saved his companion! "Never mind me!" he said, "I can hold a bit longer; go and see to my mate, for he's getting dazed, and he'll drop!" I am glad to say that this hero and his mate, too, were saved.

TRADE SURVEYS

The strongest feature in the business situation to-day is the springing up of a great number of little industries. At no time in the history of the country has there been so many new concerns started up. A broad foundation is being laid for an immense business. Building activity was never greater. Lumber dealers and architects say that more material is going into house and ship and mill building this year than ever in the history of the country. With some trifling exceptions this is also true of the iron and steel trades. Disregarding the declining demand for railway material for a few months, the iron and steel makers have had a better demand for their products than during the first four or five months of 1888. At the present time all the pipe-mills and sheet-mills are crowded with work. The plate and structural mills have nearly all they can do. The Western wire and steel nail manufacturers are very busy. The bloomaries throughout the country have a good stock of work on hand. Throughout the East the bar-mills are running half-time, but in the West they are doing better. The Southern blast-furnaces are sold from two to four months ahead, and even in Pennsylvania the output has decreased very little during the past few months. These sentiments do not harmonize with ordinary reports in trade journals. The iron and steel makers are firm believers in the theory that the summer and fall trade will be of booming proportions. Railroad projectors and promoters are waiting till some few things can be done which will strengthen confidence. Land speculators are giving it out that during the next twelve months an unusual amount of new railroad construction will be built in new localities. Capitalists interested in Southern railroad-building activity are confident that double the amount of railroad-building will be done in the States south of the Atlantic and New Mexico during the next twelve months than was done during the past twelve. The little manufacturers employing from 50 to 300 hands throughout the North have been very careful all along to not buy more material than they thought they actually needed, but within the past two weeks fresh activity has been apparent in many lines. The boot and shoe makers have been very prudent buyers of leather, but it is said that they are now purchasing larger stocks preparatory to an active fall trade. The paper-makers who have been a little apprehensive of a break in prices seem now to be satisfied that the output will not be more than the market will absorb. The manufacturers of staple hardware are holding their trade combinations together, and are realizing better prices in consequence. The manufacturers of textile goods are paying a fair dividend, and preparations are being made in a good many centres to build new mills and enlarge old ones. There is a better feeling among woolen manufacturers and textile machinery-makers they say, than within the preceding six months. In a general way the manufacturers of textile goods both North and South are extending their plants and their capacity, and are making preparations for a heavier production. The tendency in prices generally is downward. Cost of production, if it has not reached its rock-bottom basis, is not very far from it. Manufacturers and large operators are anticipating a recurrence of the active demand which has so often taken place after a long period of declining prices. The country is not at all overstocked either with crude material or finished products.

The supplies of lumber are not at all beyond what it is safe to have in stock. The supplies of coal at shipping points do not exceed from one to two weeks' ordinary market requirements. The stocks of shop and mill products are of very restricted proportions. The same statements come from Western warehouse men and jobbers. From no quarters are there complaints emanating of an over-supply of any kind. Manufacturers are keeping within sight of the market demand. Jobbers are refusing to carry larger stocks than they feel that they can succeed in distributing in sixty to ninety days. Manufacturing interests generally are selling in a creditable manner, contracting only for actual supplies as will enable them to meet their customers' wants. Speculators in stocks find it impossible, so they admit, to draw the outside public into speculation. There are numerous quantities of railroad-securities already to be unloaded as soon as an upward tendency can be manipulated. The public are cautious,—even worse, are suspicious—and it is not at all likely that the schemes of stock speculators will be realized this year; namely, that of dragging the public into a speculative movement in the various lines of railway securities which have been so carefully bolstered up for months past. The great business inquiry everywhere is: "Are we at bed-rock?" In many senses we are, but there are a few elements of doubt to be eliminated before the general upward movement that has been so often predicted will set in. The volume of ship-building work is now larger than it has been for years. The bulk of car-work placed last spring has been done. More rails have been made and sold this year than were made and sold at this time last year. The locomotive establishments have only a moderate amount of work on hand. In four or five places a few hundred hands were discharged last week. Strikes are occurring in a few Western coal mines. Over-excessive reductions and compromises are probable. A heavy demand for bituminous and block coal has set in throughout all coal centres west of the Alleghanies. During the past thirty days several large coal-mining companies have been organized: two or three to develop coal deposits in Alabama and Tennessee, and two or three to develop coal deposits in Southern California, two in New Mexico, and one not far from the Northern Pacific Railroad in Montana. However the industrial prospects may be regarded by shameful writers in daily papers, the managers of the great industries have the utmost confidence in an enlarging demand and in a general expansion of activity. The Southern cotton-mill owners are stimulated to further investments. Capitalists in Northern States are lending their money and encouragement to all manner of new industrial enterprises, in which cotton goods manufacturing gets a marked preference. Extensive purchases of ore territory have been made within a few weeks past in Tennessee, Virginia, Alabama, and there are rumors of a combination of iron-making industries in and near Birmingham which will rival the recent combination of steel-makers in Illinois. The flow of Northern and foreign capital into the South and Southwestern sections is rather increasing than declining. Two years ago a land-speculation scheme was attempted, and there are signs of its return.

In some localities of Louisiana, Texas and Alabama land is being held at speculative figures. As a rule the good sense of investors keeps them out of danger, but there is still some undue speculation going on. It would assume much more serious proportions than it has or is likely to, but for the enormous railroad construction which has opened up so much new territory. Capital finds all the opportunities that it desires. Western architects have stated within the past two weeks that their anticipations regarding small house and shop building throughout the Western States have not been overdrawn. Small towns are gaining at the expense of large ones. Among the causes for this activity are to be noticed these: First, the industrial boom throughout the South. Second, increased mining activity in the far West, and third, the outflow of population from the cities, into inviting localities beyond the Mississippi. Fourth, to larger and more easily reached markets for agricultural products, and fifth, to the sense of security felt by producing interests all through the West that railway charges will be hereafter kept in proper bounds. The heretofore exclusively agricultural character of the West is being broken up by an infusion of the industrial spirit and hundreds of little markets for agricultural products are springing up. Ten years ago farm products had to be hauled much longer distances to market than now. This decentralization of industries is but the first part of the great prosperity that is developing this and other regions west of the Mississippi River. This development is only in its infancy. Activity there will react upon the territory east of the Mississippi region and is already doing so with decidedly practical results. Agricultural-implement makers are crowded with work and have been all the year to meet the demand in the West which a few years ago had no existence. The developments of the lumber interests in Arkansas are running a good deal of capital to that State. The extent of this activity in far-off States has not been fully appreciated by the controllers of industries and of finances in the East. The foundations are being laid for vast markets and interior markets will be developed between Illinois and New Mexico, that will in a few years double and quadruple the shop productions of that region. This tendency is visible in the demand for machinery and equipments of all kinds. Western Kansas, Arkansas, Colorado and other States of the West are chief factors in it, a few years ago absorbing only trifling quantities of machinery and farming equipments, now valuable markets for innumerable products.

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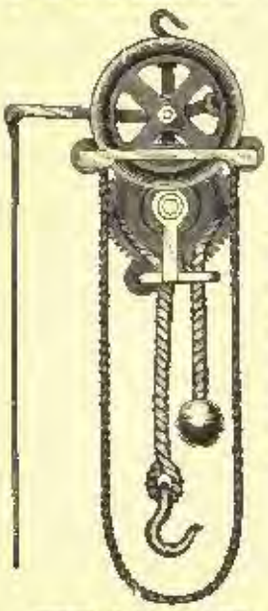

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 83. SATURDAY, MAY 4, 1889. Volume XXV. No. 687.

PAINTS.

Architects have an interest in all developments which directly or indirectly affect them. Working with them to a definite end are the manufacturers and artisans, who prepare and use the materials employed in erecting buildings, all tending toward a higher state of perfection, and all giving tangible and eloquent expression to their motives, talent and activity in the structures which they erect. Is this unity of interest between the architect, the manufacturer, and the artisan fully recognized? Is this essential co-working intelligently carried out? Do the manufacturer and the artisan catch the spirit of the architect, comprehend his drawings and specifications, so that his thought finds clear, tangible expression? Does the architect know the best the various manufacturers can offer for his use? Does he keep abreast of developments and improvements, so that his specifications call for the best articles? Can he be sure of satisfactory results in the carrying out of his designs unless he has entire command of his resources, and can specify the best materials?

In the manufacture of paints, for instance, there have been developments which place within reach of architects an article superior to what has been, until recent years, almost uniformly specified for the painting of buildings. This article is a prepared paint. It is undeniable that there have been good reasons for adhering to the old rule for paint specifications. Many worthless mixtures have borne the name of *paints*, and architects who have taken the trouble to investigate the validity of the claims made for these mixtures have been convinced that the paints were worthless; or, if of any value, that there was no assurance that the standard of quality, if there was one, would be maintained for any length of time. The use of such paints has been found expensive, because of their poor covering qualities, and still more because they would perish soon after being applied.

Is it just, however, to judge prepared paints of all kinds by an unfortunate experience with a few? Is it consistent with an architect's interests to stick closely to an old custom from a firm belief that it is safe when there are other ways decidedly better for him to adopt? There are manufacturers of brick, tile, ironwork, trimmings, and innumerable other articles used in buildings, whose products the architect specifies with confidence. Why cannot paint be made of such quality as to merit his confidence? It can be. It is.

The Sherwin-Williams Paint is not a mixture put upon the market for the mere purpose of enriching the men who make it. It is made and sold to paint buildings with. It was made at the first with some understanding of the building material it was intended to cover; with some knowledge of the conditions of exposure to which it would be subjected; with a definite knowledge that it must be a preservative; with a clear conception of its service as a decorative element. With these objects in view, was it possible to use any but the best materials, the completest facilities, the highest order of talent, in its production? Is it possible that, with such good objects to attain at the commencement, and a phenomenally successful experience of nearly twenty years, during which time this product has constantly tended toward a higher state of

THE SHERWIN-WILLIAMS CO.'S WORKS AND GENERAL OFFICES
AT CLEVELAND, O., U. S. A.

faction in all points of its adaptation to architectural uses, this paint is unworthy of the architect's favorable consideration? Would it be policy for a company of honorable gentlemen, who have spent the most fruitful years of their lives in producing, perfecting and marketing standard goods, who have made their products famous for excellence all over the continent, to sully their fair reputation by letting the quality decline? It would not. Such men have all the emulation for progress and perfection in their business that architects have in their profession. A good "prepared paint" is a decidedly important article for architects to seriously consider, and to include in their specifications. The Sherwin-Williams Paint has advantages which will commend it to them. A profession like that of architecture, which, more than any other, must be studious and progressive to meet the increasingly exacting demands upon it, cannot afford to ignore the claims of reliable manufacturers.

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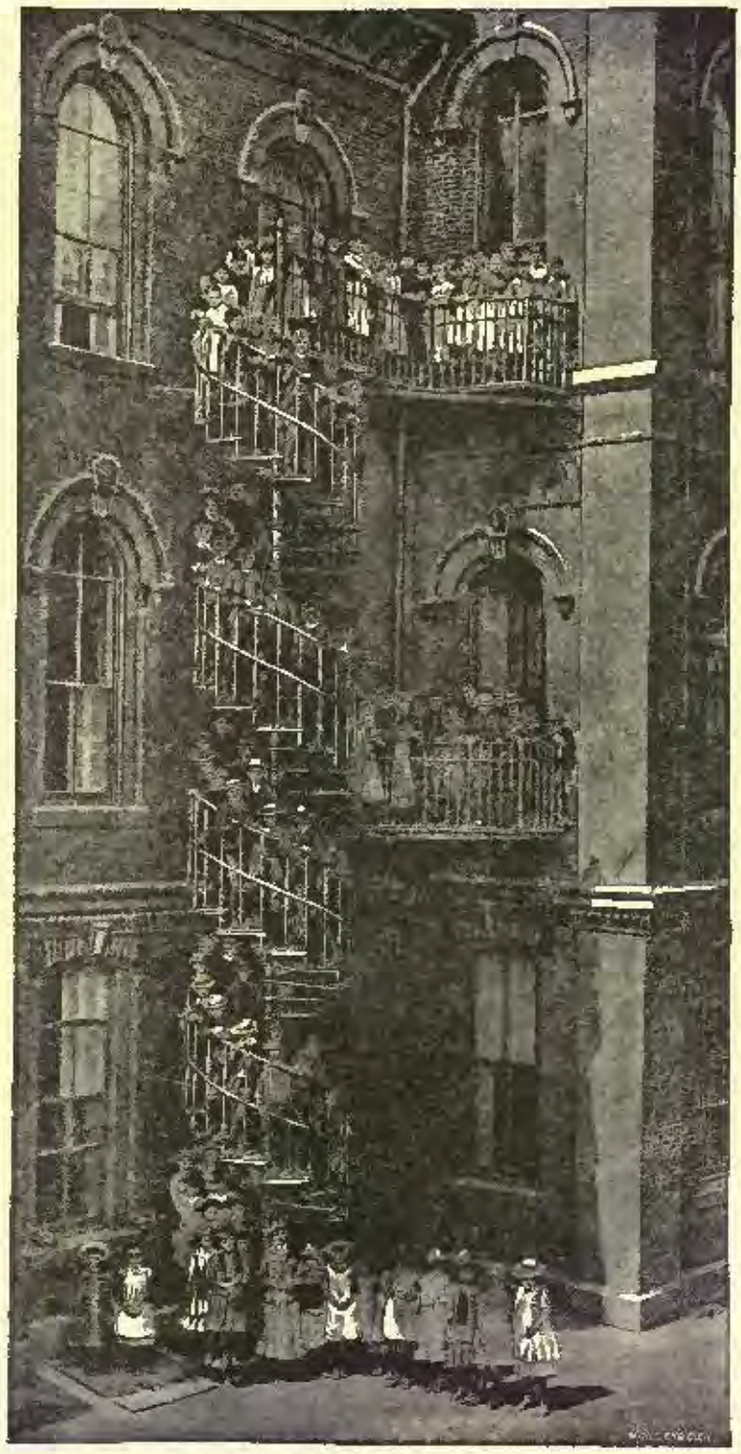

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HOUSE-LINING.

THE hollow wall and empty floor-space are necessary features in frame-buildings, and whether it is advisable to seal them tight with inflammable sheathing-paper, in order to obtain insulated air, or to gain it by filling-up the spaces with a low conductor of heat, depends largely on the practical working of what is considered an air-space, and again on the value of the material forming the lining.

Ten years ago steam-pipes and boilers were systematically covered with a plaster-casing, which was designed to leave an inch or so of room for the *quiescent* air, but since the introduction of mineral wool the fallacy of this method has been so thoroughly exposed that the device is now limited to jobs not open to competition. The air on surface of pipe, of course, conveys the heat immediately to the interior of casing, and the temperatures of both these surfaces are manifestly nearly the same; again, when cracks occur in the casing, cold-air enters to replace the hot-air, thus creating a rapid circulation, which cools down the jacket from within and deceives the owner, for he is wasting fuel and does not know it.

The action of the hollow-wall space is similar to this, and quite as deceptive. The reason we make special mention of the theory is because it is widely accepted as true, and its working is so delusive that it requires explanation rather than trial.

Wherever the idea of the air-space is resorted to, whether on a boiler or in the side-wall of a dwelling, it simply introduces the properties of convection and absorption as factors, and these might better be eliminated by filling the space up.

The advantages of mineral-wool for houses will become apparent as we refer to the objects of such linings:

A. As to heat and cold. — A filling of mineral-wool in the ground-floor, say two inches thick, protects against the dampness of cellar; in the outside walls, from foundation to peak, between the studding, it will prevent the extraction of the warmth of interior, and will destroy the force of winds, which otherwise will penetrate and cause draughts; in the roof, say two inches thick, it will retain the heat which rises through stair-wells, bringing about regularity of temperature in cold weather; the upper rooms will not receive the heat of the summer sun and store it up for the occupants during the night, but remain as cool as those on the floor below; the water-fixtures in bath-rooms, closets and pantries will not be exposed to extremes of heat and cold.

B. As to sound. — As sound is communicated by the actual contact of beams, and also by the vibration of the air between them, it can well be understood how a porous material like mineral-wool will have a muffling influence on the solid parts of a building, and so occupy the space that wave motion will not be possible. Such a lining is especially desirable

about bath-rooms to deaden noise of valves and flowing water.

C. As to rats, mice, insects and disease germs.—The analysis of mineral wool shows it to be a silicate of magnesia, lime, alumina, potash and soda. The slag-wool contains also some sulphur compounds. It is plain there is nothing organic in the material to decay or to furnish food and comfort to insects and vermin; on the other hand, the fine fibres of glass are irritating to anything which attempts to burrow in them. From our experience during the past ten years, we feel confident in saying that new houses lined with mineral wool will not become infested with animal life, and old walls may be rid of their tenants by the introduction of it.

D. As to fire.—Our incombustible material renders a building slow-burning; we do not claim that the structure will be *fireproof*, for that is impossible so long as inflammable stuff is used in construction. In passages occupied by the mineral-wool, flames cannot spread; thus surely will they be exposed to sight, and an opportunity for quenching them be offered at the outset. *As an escape for the inmates, it serves the purpose better than all the ladders ever devised.*

What is described as spontaneous combustion takes place when the floor-beams, for instance, have been dried until the point of ignition is very low, and when in conjunction with this, the freely-circulating air is charged with moisture. With these two conditions fulfilled, it only needs the fanning action of a draught to start combustion. Such a coincidence of conditions cannot be brought about if the spaces between beams are filled with indestructible mineral wool.

Mineral-wool is invaluable in hospitals and asylums on account of its arresting the spread of fire, not to mention its other properties. Equally important applications can be made with it in public and private schools, music and concert rooms, sounding-boards, hotels, cottages, country residences, charitable institutions, and in deadening the flats of apartment-houses, and insulating the outside walls of conservatories, hen and pigeon houses.

FRANK E. FITTS,
Successor to GEO. DUNBAR & CO.,
74-76 PEARL STREET, BOSTON, MASS.

THE CALDWELL SASH-BALANCE.

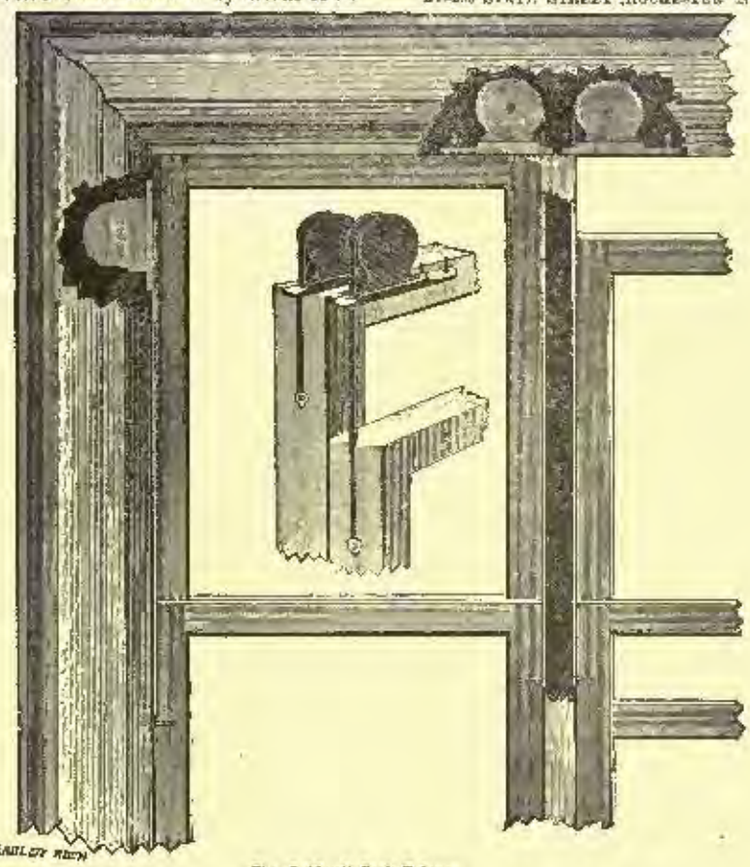
THE Caldwell Sash-Balance is a simple, durable and compact appliance for balancing window-sashes. It consists of a thoroughly-tested steel clock-spring, coiled within an iron drum, around which is wound a tempered brass tape or ribbon, which is attached to the sash; while the resistance of the spring furnishes the requisite tension or supporting power. The tension of the spring is controlled by means of a brake, which is regulated by a screw in the face-plate, whereby the balance may easily and conveniently be adjusted at any time to the exact weight of the sash, and give to the latter a steady or uniform motion. The suspending tape or ribbon is attached to the sash by means of a bronze loop, held in place by a screw, which should be slightly loosened and the loop unhooked whenever it may be necessary to remove the sash from the frame; and, in replacing the sash, the tightening of the same screw over the loop will secure the window as before.

The mullion, or tip-balance, can be applied at the top of the frame in all windows where it may be impracticable to use the side-balance.

The balances are put up in boxes, each box containing one set of four balances for the two sashes of single window, with all the necessary screws, each sash requiring two balances. Full printed directions for setting and adjusting the balances are contained in each box.

When ordering balances, be careful to give the exact weight and height of each sash.

THE CALDWELL MANUFACTURING CO.,
288-290 STATE STREET, ROCHESTER, N.Y.



The Caldwell Sash-Balance.

A BIG CONTRACT.

THE Whittier Machine Company have just signed the contracts for furnishing the complete elevator system, together with the boilers and the entire heating and ventilating apparatus, for the new Exchange Building about to be erected on State Street, Boston. The aggregate work represented by these and other important contracts which they have recently taken, is very large. They are about to have plans drawn for a building specially adapted to the construction of elevators, which,

MINERAL WOOL.

THE BEST THING FOR
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Insulation of Heat. Deadening of Sound. Protection Against Fire. Prevention of Spreading of Fire. Freedom from Rats, Mice, and Insects.

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Bardsley's Patent Wood Door Knobs.

The engraving represents No. 101 Ball Knob, a style which is meeting with great favor, as it shows up the grain of the wood nicely, and makes a handsome appearance on a door. Besides the regular woods which we carry in stock, we make them to match special trim in such woods as Antique Oak, Red Oak, Sycamore, Hazel, Birch, Bird's-Eye Maple, etc. These goods are first class in every respect, the trimmings are solid bronze, and every knob is warranted.

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They operate absolutely without noise or violence, closing the door gently and stopping it at once in its proper position.

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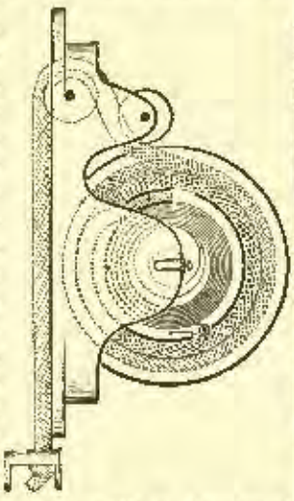
with tools expressly designed to meet the requirements of the work, will greatly increase the capacity of their works.

They have recently put into the Brigham Estate building on the corner of Portland and Causeway Streets, Boston, two horizontal steel boilers, each four feet in diameter, together with two belt freight elevators, and also constructed for the Piscataquis Falls Pulp and Paper Company of Montague, Me., a horizontal steel boiler, five feet in diameter; and have put into the building of the Boston Real Estate Trust on Lincoln Street, Boston, two belt elevators for freight service.

ROCHESTER SASH-BALANCE.

The following cut and the one on the next page represent the Rochester Sash-Balance which will prove of great value to those interested in the construction of buildings.

It consists of a hollow pulley containing a coiled steel spring, and a braided sash-cord for suspending the sash. This cord is fastened to, and winds on the pulley passing over the small wheels, as shown in sectional view. These wheels are located in such a manner that the belt of the sash, being fastened to the cord, automatically regulates the tension or lifting power of the balance. This is a great advantage over weights as the sash is always accurately balanced, even though they differ in weight.



The cord runs smoothly over the grooved wheels and at no place can it rub against the balance, there is consequently no abrasion of the cord or friction to wear it out, but in case it becomes broken by accident it can be readily replaced at any hardware store, and with very little trouble.

The advantages of the Rochester Balance are numerous. No boxes or pockets are required in the window frame, more light can be obtained in factories, etc., as the walls can be built solid against a plank frame and the room that would be required for box frames could be added to the width of the sash.

The mortise for this balance is made with a bit, and it is attached very quickly to either old or new work, and it is very little trouble in handling. It is the cheapest means for hanging window-sashes.

The Rochester Balance is meeting with great success and the company requests all architects to send for a free sample to the

ROCHESTER SASH-BALANCE CO.,
Cor. Frank & Center Streets, Rochester, N. Y.

NOTES.

The Lidgerwood Manufacturing Company, New York, find a steadily increasing demand for their improved hoisting-machinery throughout the South. They have recently appointed as their Birmingham, Ala., representatives, Messrs. Milner & Kettig. They are an enterprising firm, and will doubtless meet with much success in handling this well-known line of hoisting machinery.

The interior of the new building erected by the Murphy Varnish Company, of Newark, from the plans of J. H. Lindsay, architect, has just been completed by finishing the decoration and placing the stained-glass. This work has been executed by Messrs. J. &

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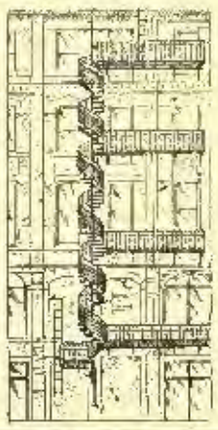
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Philadelphia,	108 Chestnut St. H. R. Knickle, Sr. & Co.	
St. Louis, Kansas City, Denver,	201, 204 Washington Av. 513 Union Avenue, 1780 Seventeenth St.	Fairbanks & Co.
Omaha,	1619 Capitol Avenue, F. C. Ayer.	
Pine Bluffs, Ark.		Geo. M. Dilley & Sons.
Salt Lake City, Butte, Mont.	159 S. Main St. n. Granite St.	Utah & Montana Machinery Co.
San Francisco, Portland, Or.	31, 33 Fremont Street, 31, 35 N. Front St.	Parke & Lacy Co. Parke & Lacy Mch. Co.
Charlotte, N. C. Atlanta, Ga.	34 College St. 45 S. Prior St.	The O. A. Longbine Co.
Dallas, Tex. Chattanooga, Tenn.,		Keating Imp. & Machine Co. C. E. James & Co.

R. Lamb, of New York, the color scheme having been carried out by Mr. F. S. Lamb. The glass has been done in Venetian and Opalescent, the general treatment being a rich arrangement of delicate tones of color and jewelled work. The most elaborate part of the work is in the President's office, and in the large staircase window. In the latter the date of the establishment of the Company and the monogram of the firm have been artistically introduced in connection with ribbons and foliated work.

The Whittier Machine Company have recently constructed for the Charleston Cotton-Mills of Charleston, S. C., two horizontal steel-boilers each six feet in diameter, and also a belt freight elevator; have also put into the residence of Mr. Franklin Haven, on Mt. Vernon Street, Boston, a plunger elevator for passenger service.

The E. D. Albro Co., Cincinnati, O., manufacturers of veneers and thin lumber, report: "We have a steady demand this season for our products. Builders and contractors appreciate well-seasoned lumber for inside finish, and the quartered sawed oak and light-colored woods are being more called for. We have a full line of all kinds, including white walnut (called butternut), cherry, quartered-oak, white maple, white ash and mahogany. Prima Vera, or white mahogany, is coming rapidly into favor. This is of a beautiful light-gold color, and finished like satinwood, which gives a warmth and tone unexcelled by any other woods. They have a full stock of hard woods of all thicknesses and kinds."

The ingenuity of the advertiser is a matter of perennial interest and many a laugh is caused by some ludicrous conceit which has paid its own way by catching the attention for a moment. Some devices gain their point by serving as a useful utensil which keeps the advertiser's name constantly before a special public. This end has been attained by the Barstow Stove Company of Providence, who have sent out to architects as a reminder a useful little pencil sharpener.

BUILDING INTELLIGENCE.

Reported for the American Architect and Building News.

HOUSES.

Philadelphia, Pa.—*Washington La.*, n e cor. Reading R. R., three-st'y stone dwell. and addition to barn; owner, W. R. Brown, 2145 Dickinson St.

Leidy St., w s, n Willow Grove Ave., three-st'y brick dwell.; owner, Michael Hagerty, hotel, Main St., Chestnut Hill.

North Thirty-ninth St., *No.* 104, two-st'y brick dwell.; owner, Frank H. Sonden, 3007 Aspen St.

Chew St., n s, e Chelten Ave., 2 three-st'y brick dwells.; owner, James Morris, Chelten Ave., Germantown.

Chew St., s w s, 4 three-st'y brick dwells.; owner, Oliver P. Fisher, Hermit and Hancock Sts., Germantown.

Hewson St., s s, bet. Tulip and Memphis Sts., 3 two-st'y brick dwells.; owner, James Macaulay & Sons, 1328 East Montgomery Ave.

Marshall St., e s, n Berks St., 25 two-st'y brick dwells.; owner, George Kessler, 1332 Marshall St.

Callowhill St., *Nos.* 2332-2334-2336, 3 two-st'y brick dwells.; owners, Patrick & Lipsett, 1623 Callowhill St.

Tuckaseoma St., s s, bet. Plumb and Margaretta Sts., two-st'y brick dwell., with 16' of frame back; owner, Joseph P. Yerkes, 4323 Frankford Ave.

Sixty-three-and-one-half St., w s, bet. Vine and Callowhill Sts., one three and 3 two st'y buildings; builder, E. D. Murphy, Sixty-fourth and Callowhill Sts.

Twenty-ninth St., w s, ab. Ridge Ave., 2 three-st'y brick dwells.; owner, T. H. Helme, 2345 North Twenty-seventh St.

South Broad St., *Nos.* 1609-1611, 2 three-st'y brick dwells.; owner, Edward Kelley, 762 South Ninth St.

Tasker St., n s, e Seventh St., 3 two-st'y brick dwells.; contractor, F. H. Markley, 2036 Fairview Ave.

Waterloo St., e s, n Berks St., 26 two-st'y brick dwells.; owners, Eldridge & Stewart, American and Diamond Sts.

Howard St., w s, 20 two-st'y brick dwells., two with stores; owners, Eldridge & Stewart, American and Diamond Sts.

Jefferson St., s s, w s Fourth St., 7 two-st'y brick dwells.; owner, George W. Hancock, 408 Lancaster Ave.

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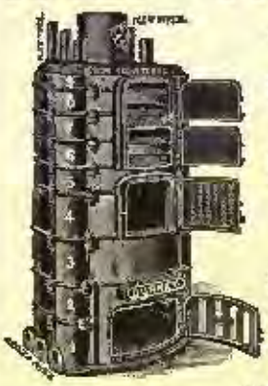

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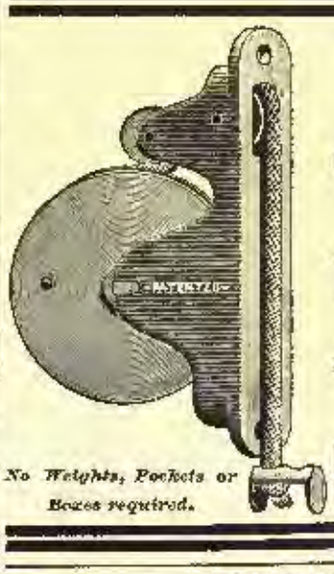

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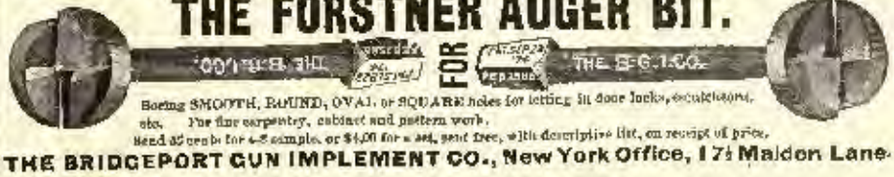

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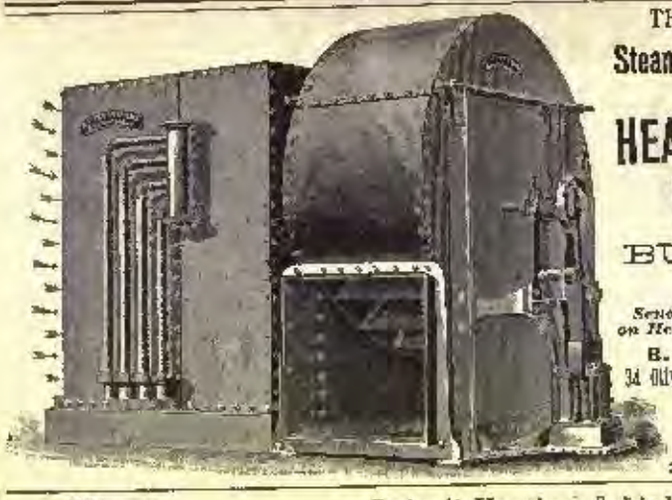

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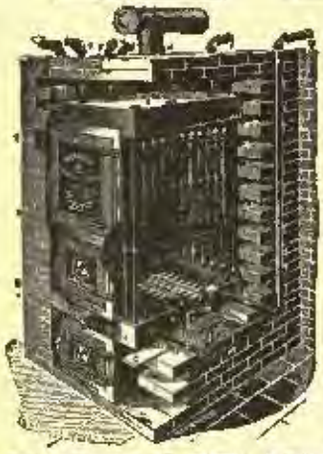

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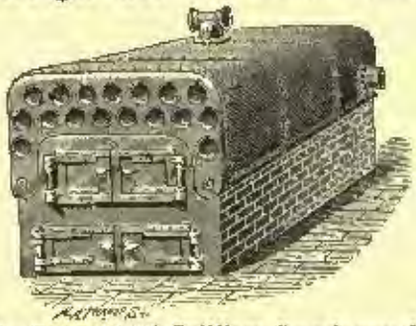

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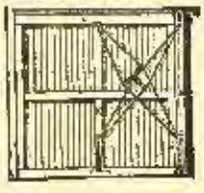

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BRACE HANGERS, concealed from view, for PARLOR DOORS.
No Rolls or Track. Hangers for Elevator Doors a Specialty. Send for Circular.
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108-110 Randolph St., Chicago, Ill.

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is compact, simple and Durable. It is easily applied and is superior to all other methods for Balancing Window Sash. Adapted to old or new windows, does not require box frames and does not get out of order. The Caldwell Balance for Mullion Windows is the best yet invented.
N. B.—In ordering sample set give exact weight and height of each sash. Send for catalogue to
CALDWELL MFG. CO.,
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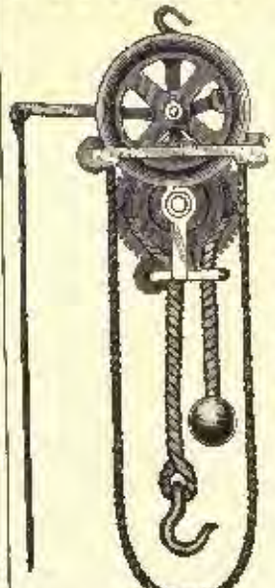
Portable Hoist.



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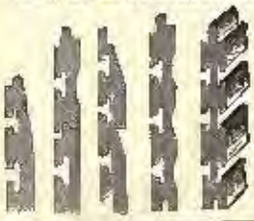

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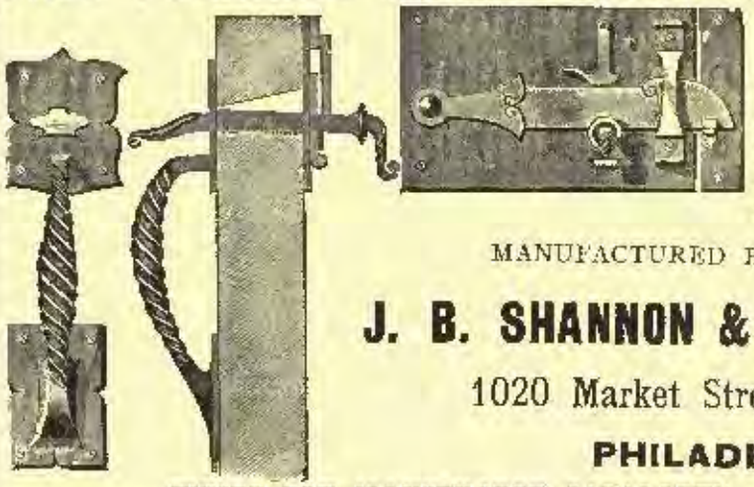

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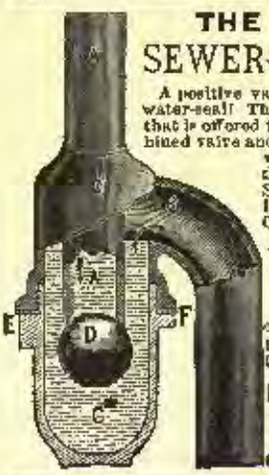

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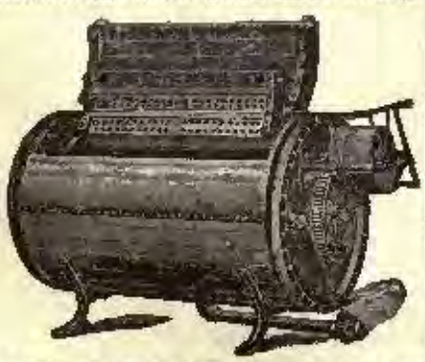

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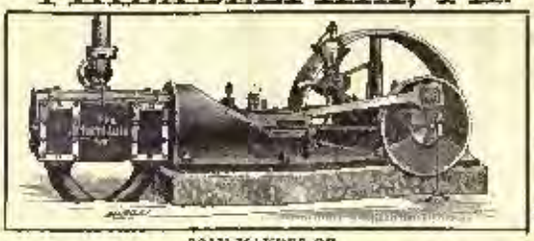

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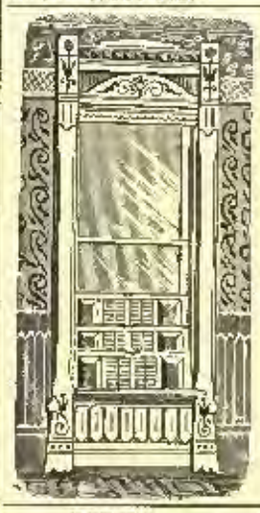

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JUNE 1, 1889.

Entered at the Post-Office at Boston as second-class matter.

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AS we forgot last year to offer certain broken volumes at reduced prices, as we have made it our practice to do, we ought in regular course to offer now the broken volumes for 1882 and 1883, but we have concluded to sell the 1884 issues also. The broken sets for these three years will be made up in lots of twenty issues each and sold for one dollar per lot. This arrangement will debar a purchaser from making his own selection but it will enable him to obtain, as the years are nearly complete, for seven dollars what is usually sold for more than three times that amount.

THE ballots for and against the consolidation of the American Institute of Architects and the Western Association of Architects were counted last week simultaneously in New York and Chicago. The vote of the American Institute was in favor of consolidation by a nearly unanimous vote, only nine negative ballots being cast, while the Western Association was even more emphatic in its approval of the plan, three votes only, out of two hundred and sixty-five cast, as we learn from the *Inland Architect*, being against consolidation. The date of the first Convention of the new Institute has not been fixed and will not be for some time yet, but the profession is to be congratulated on the unanimity with which the reorganized National Association begins its new career. May it have a long and happy life!

SOME of the New York papers are talking about the decision of the Trustees of the new cathedral, in regard to the competitive designs, as if they found some sort of public grievance in it. The *Times*, for example, thinks it very strange that the designs of comparatively unknown men should have been selected, to the exclusion of those made by architects of long experience and well-earned fame, and thinks that if a public exhibition of the drawings had been made before the decision, the Trustees would have been assisted in coming to a more correct conclusion. We are quite sure that no architect has been concerned in any of these complaints, and hope that the profession will use all the influence it possesses in repressing them, and in upholding the decision of the Trustees as having been made with the most conscientious care, and under the best and most impartial expert advice that this country could furnish, and as being final and binding upon all persons who think that courtesy and honor are the first consideration in such matters. The *Times* has perhaps a shadow of reason for thinking that a public exhibition of the designs might have conduced to a correct decision, the judgment of a large number of people, exercised upon objects which have become familiar by repeated inspection, being generally good, but in the case of the cathedral, as we understand, the Trustees wished to have such an exhibition, but were prevented by the refusal of a majority of the competitors to allow their drawings to be shown in public before the decision, so that the blame for this, if there is to be any blame, should fall upon the competitors, and not upon the Trustees, who have, as it seems to us, done the best that they could, and all that any one could do, to secure for their great church the best design that the architects of the present day can furnish.

WHAT a common foible it is of humanity — architectural humanity of the American species — to suspect enmity and malice at every turn! This peculiar form of introspective sensitiveness has long been understood to be a peculiarity of artists, but architects who undertake to handle everyday matters in this work-a-day world ought, one would suppose, to have enough common-sense in their make-up to be able to realize that ninety-nine per cent of the inhabitants of the world are wholly indifferent to the success or failure of their fellows, and that the number who delight in malicious acts at the expense of others is infinitesimal indeed. The latest instance of this supersensitiveness with which we have been confronted is the charge brought against us by the "friends" of Mr. W. W. Kent, who maintain that, in giving the names of the successful competitors in the New York Cathedral competition, we "suppressed" the fact that he was associated with Messrs. Heins & La Farge in the preparation of their design. As the friends of General William Sooy Smith, who, it appears, was also an associate in this undertaking, have not brought a like indictment against us, we infer that engineers, being of less artistic temperament, have friends of sufficient *savoir-vivre* to know that it is not necessary to charge malicious "suppression" in order to effect a desired correction of an inaccurate statement. To Mr. Kent and General Smith we desire to say that at the time our statement was made we were wholly ignorant of their connection with the competition.

HERR CARL HINTRAGER, of Vienna, is an architect who has chosen to make a specialty of the design and construction of school-houses, and, in pursuance of this resolution, has made, what architects who have school-houses to design do not always consider necessary, a study of what has been done by others to fulfil the requirements peculiar to structures of this sort. Herr Hintrāger is now, as we learn, engaged in the study of American school-houses, which will furnish him at least a rich variety of examples of what to avoid, and, meanwhile, has published an essay on Swiss and Italian school-buildings, which was first read before the Austrian Society of Engineers and Architects, and has but one fault — that it is far too short. As most architects know, the ideas of the Swiss in regard to instruction in schools, the division into classes, and the separation of the sexes, are very similar to ours, perhaps more nearly so than those of any other people in Europe, and their school-houses furnish, in consequence, models which can be adapted to our use almost without change. Moreover, the attention of architects has of late years been drawn particularly to their planning and construction, by the well-conducted competitions through which designs for nearly all of them are obtained, and, while the earlier buildings are perhaps no better than ours, the more recent Swiss school-houses are admirable, to a degree which one who has not studied and compared many school-house plans can hardly comprehend, in all the details of their arrangement. As in most of our States, education in Switzerland is compulsory, all children being required, by strict laws, zealously enforced, to attend school from their sixth or seventh year to their twelfth, thirteenth, fourteenth or fifteenth, according to their circumstances, the cantons fixing their own regulations in this respect, and, much more than with us, the erection of handsome, well-planned and well-situated school-houses, "the people's palaces," as the Swiss call them, is a matter of pride to even the smallest villages, so that, as Herr Hintrāger informs us, a town like Aarau or Zofingen, with four or five thousand inhabitants, will spend two hundred thousand dollars on school-buildings, in addition to the cost of the land. In the country districts, it is common for several villages to unite in the erection of a substantial and well-planned building,

which is placed in the most healthful location that can be had —never in an abandoned graveyard, as in a case we once heard of in Massachusetts, and is arranged with particular reference to securing the best effects of air and sunshine that it is possible to obtain. There is just now a discussion whether an aspect due south or southeast is most favorable to the health of the children who are to occupy the school-rooms, but some sort of southerly aspect is secured in nearly all school-houses. In plan, the structure is divided like our own modern school-buildings, into class-rooms, arranged to accommodate not more than fifty pupils each, and approached by a brightly lighted corridor, often sixteen feet or more in width, which affords facilities for the orderly movement of the children to and from their places, at the same time that it furnishes them with a play-room for stormy weather.

IT would take too long to mention the other interesting pecularities of the Swiss schools, which Herr Hinträger describes in his book, but we ought not to omit a reference to the gymnasiums, which are attached to nearly all school-houses, in compliance with the Federal Law, which was passed in 1878, and requires that all Swiss boys shall have regular training in gymnastics during the last six years of their school life. In most cases, the gymnasiums, or turn-halls, are airy buildings immediately connected with the school-houses, and well supplied with apparatus, so that they may be, and often are, utilized, out of school hours, by clubs or private persons. In all but the compulsory addition of a gymnasium to the other accommodations, the modern Italian school-houses closely resemble those of Switzerland. It is hardly necessary to explain to any one who has the smallest notion of what has been going on in Europe since 1860, that the Italy of the German writers, that produced nothing but hand-organ grinders, while the rest of Europe was trying to civilize itself, has long ceased to exist, and the Italy of to-day, in its efforts for popular education, presses closely on the heels of Switzerland, the foremost of European nations. Herr Hinträger, to give an idea of the average amount of money devoted by the Italian cities every year to the erection of schools, quotes the official statistics for 1881, which show that in that year Turin, a town of two hundred and fifteen thousand inhabitants, spent three hundred and seventy-five thousand dollars in new school-houses; Genoa, with a population of one hundred and sixty-five thousand, spent two hundred thousand in the same way, and Naples, which we commonly picture to ourselves as being inhabited almost exclusively by lazzaroni and brigands, expended four hundred thousand. As architects will easily conceive, the new Italian school-buildings are of the most substantial character. As in Switzerland, a very wide corridor, with ample windows, occupies most of one side of the structure, and gives access to the class-rooms, which occupy the other, and are limited to a capacity of fifty scholars each. The class-rooms face directly south, and a spacious cloak-room often intervenes between them and the corridor. The building has no cellar, but the first floor is raised above the ground, and the space under it is left open, so that the air can circulate freely through it. In Rome, where the antique traditions perhaps prevail more completely than in the newer cities of the north, the corridors and wardrobes in each story are covered with barrel vaults, two inches thick, made of tiles, cemented together with pozzolana, and levelled up to receive the tile floors. The roof is of the same construction, but, to prevent the heat of the sun from affecting the rooms under it, dry gravel is put over the tile vaults, and the roofing formed with tiles covered with asphalt.

AN exhibition of American industrial art is to be held at Philadelphia, in the Memorial Hall in Fairmount Park, from October 7 to November 18 next. The exhibition will comprise objects of pottery, porcelain, glass-ware, tiles, terra-cotta, mosaic and stained glass, and prizes are to be given, on the award of competent experts. The stained-glass section, which is the one which will most interest architects, is under the charge of a committee, of which Mr. Theophilus P. Chandler, Jr., is chairman, and an earnest invitation has been issued to all Americans engaged in making stained-glass to contribute their best work, which will be shown under as favorable conditions as possible by glazing the arcades in front of the building. In addition to gold, silver and bronze medals for the best domestic, ecclesiastical and plain leaded work, a special prize of two hundred dollars in money is to be given to the author of the best cartoon for a figure or ornamental window, accompanied by a sketch showing the scheme of color. Mr. Chandler's committee calls attention to the fact that, although an immense quantity of stained-glass is imported into this country every year, the art of making it and putting it together has advanced greatly in this country during the past decade, and it may well be doubted whether England, Germany or France could make a better exhibition of the sort than would be presented by a collection of the best work of the best American makers and designers. We are willing, for ourselves, to go still further, and to say that in the opal glass invented and improved in America we have a material which has doubled the resources of the glass-painter; while the methods in which even transparent glass is used here, by plating, drilling and insertion of colors, and casting of pieces, and so on, afford whole fields of delightful novelty, as yet unexplored. That these methods are always used here with perfect taste we do not pretend, but the best of the modern American work is, in our humble opinion, so infinitely superior in technique to that done elsewhere that a good collection of it will be worth a long journey to see.

SOME time ago, a firm of architects wrote to the *Engineering and Building Record* for comment upon two forms of schedules of charges, which they had proposed to use in their own practice if they could decide which was the better of the two. The first schedule contains rates of commission for buildings of different cost, at about one-half more than the common charges, with the explanation that for these prices the architects will keep, at their own expense, a clerk-of-works constantly on the ground in the case of structures important enough to require such care, and will assume responsibility for the supervision of the execution of the work. In the second schedule, which is more like that in common use among offices, the fee is set at various sums for buildings costing less than seventy-five hundred dollars, seven hundred and fifty dollars for those costing from seventy-five hundred to fifteen thousand dollars, and five per cent for those costing more than fifteen thousand dollars, the employment of a clerk-of-works being strongly advised in all cases, and the stipulation being made that, where one is not employed, the architects will not be responsible for any defects in workmanship which might have been avoided by such supervision as it is the province of a clerk-of-works to give. To both the schedules the usual clauses are added, providing for the rate of charge for monumental and furniture work, for selection of stuffs and furniture, for partial service, ownership of drawings, and so on, besides some novel, but excellent stipulations, to the effect that if the owner mentions requirements both as to the accommodation desired and the amount to be expended, the architects will not undertake to conform to both of them, but will agree to conform to whichever one the owner may select, and to comply with the other as nearly as circumstances will admit; and further, that if the owner specifies a certain limit of cost before the working-drawings are prepared, and at the same time insists upon items of accommodation, structure and finish which, in the opinion of the architects, will cause the cost to exceed the limit specified, the usual commission shall be paid for the plans, even though they may be discarded, when the estimates are received, on account of the excessive cost. As it was not our advice that was asked upon these schedules, we will not intrude it; but the publication in the *Record* has hardly elicited the discussion that the subject deserves, and we would like to do what we can to revive the matter, and we may, at least, express our satisfaction with the way in which the schedules in question have been drawn up. If architects generally would be as prudent and business-like in making terms before they began their work, they would be much better pleased with their clients when they got through, and their clients with them. The question of whether the architect shall under any circumstances provide a clerk-of-works at his own expense is complicated by the consideration that the owner may be more likely to allow the building to linger along, to the great detriment of the architect, if it is the latter who pays the clerk-of-works; but there is something to be said on both sides, and we trust the whole matter may be thoroughly discussed, and some united action taken, at the first convention of that vigorous young Institute which is to do so much for us all, whenever its somewhat protracted incubation shall be completed.

MALARIA.[1]—II.

A CAREFUL study of the subject of malaria has recently been made by Dr. Nicholas,[2] the Health Officer of the Panama Canal Company. He says that the atmosphere over marshes is more plentifully charged with bacteria and with filamentous algæ, than is that over healthy land. He quotes from Mouriel, who says:

"The explanation is to be found almost solely in the configuration of the marsh and the change of its level at intervals sufficiently long for the ground uncovered by the water to become completely dry — ground which, dry at the surface, is damp underneath, and that these zones occupy a surface of considerable extent. The minute organisms of the marsh cannot escape into the atmosphere so long as the ground remains covered by a sheet of water. This sheet of water is a preservative screen. All who have studied the progress of paludism understand this. It is the same with those parts that are mainly humid; the minute organisms find in this humidity a cause of adhesion sufficient to resist atmospheric movement and remain attached to their natural medium. But let them dry, let the *chroococcus* which had formed a uniform coating become separated by heat, let these amibes, momentarily transformed into minute pellicles, lose all adhesion with the bodies about them, and all of these minute growths will be lifted by the least movement of the atmosphere, which may thus maintain them in suspension. To appreciate the quantity that may enter the respiratory passages, it will suffice to recall the fact that my experiments never covered more than 100 litres of air, and that, notwithstanding, each drop of liquid contained some of these organisms, and if some among these had perished, others, on the contrary, had not suffered enough from desiccation to prevent them from resuming their activity and continuing (in the body) a life all the more active because they there found, at least, two conditions most favorable to their existence: warmth and humidity. Of all of the parts of a marsh, only one interests us; it is that which, recently dried, still retains at its surface organisms dry enough to be taken up by the atmosphere, but at the same time not dry enough to have lost their life. It is this zone that I have designated for a long time under the name of the *dangerous zone*. . . . It is true that in the analysis of a salubrious air, these microbes may have been seen to develop, after a certain time, in the water by which the air has been washed, or in water of condensation. This has always required a considerable time, while in the atmosphere of marshes, I have met them in a full state of development."

Dr. Nicholas thinks that:

"These considerations relative to the 'dangerous zone' of swamps explain why the presence of visible water is not indispensable to the production of fevers, which may break out in a country, maintain themselves, disappear, and reappear when, whatever may be the nature of the ground, earthworks expose to the air the products of incomplete decomposition which have accumulated in the earth and are disengaged by the excavation (Chevreuel). This is the condition of the Roman Campagna."

Nicholas adduces the opinion of Leon Colin that the ground here considered is not properly a marsh, and that the influence producing a miasm is rather telluric than paludal; that it is not the effect of the putrefaction of organic matters, but of an influence due to the soil itself. Dr. Nicholas thinks that:

"The disturbing of the earth in the construction of the Panama Canal was not of itself the greatest source of malaria. Outbreaks of fever were not so much in proportion to the excavations as to the changing of the hygrometric conditions of the ground; for at the Isthmus, as elsewhere — daily observation demonstrated this in all the camps — the particular source of tropical insalubrity is a marsh. Excavation and filling are inoffensive when they do not cause the standing and stagnation of water, whether of rain, of springs, or of a river. On the contrary, a marsh is quickly constituted in a country where the vigor of vegetation in the course of a single season covers under a mantle of growing forest all trace of the most recent work, and everywhere where this occurs the marsh infects the seat of the work, and the encampment as well. Arid though they are, the virgin lands of hot countries need only a stroke of the spade to develop pernicious water; but they are all made salubrious by drainage, and, in order that malaria may be produced there, it is always necessary that the water should have entered the ground (*fecondé le steppe*), whether on the banks of the Tarim at an elevation of 1 to 3,000 metres, in the desert of Gobi, or in the fertile valley of the Euphrates or on the banks of the fluctuating White and Blue Niles. It often suffices that the course of a torrent, of a river, or of a small brook should be arrested where the banks are low, in order that malarial mortality should be aggravated as a consequence of inundation; and it is thus that we have seen an increase in malarial death on the course of the Missouri and of its affluents, the Kansas and Yellowstone. It is not without interest, at least when we are considering the effect of excavations, to know that the number of germs, of whatever sort, decrease on virgin soils with the depth of the cutting. Microbists are unanimous in this opinion. According to Frankel, the number of microbes at a depth of 1.25 metres is six times less than at the surface. According to Maggiora, the number is much less in desert and forest soils than in cultivated lands; that is to say, as Duclaux has remarked, the number will vary in a soil that is neither inundated nor too dry with the quantity and quality of organic matters. It will be readily appreciated that Maggiora has found the number to be inversely to the geologic age of the ground, to altitude, to compactness and to impermeability, and that it increases with the richness of manuring and the thoroughness of cultivation.

"In closing, I will confine myself to reminding cosmographers, and especially sanitarians, that neither humus nor water, nor their association in a marshy soil, is absolutely necessary to the evolution of malarial germs in localities subject to palulal fevers. It suffices that these germs find in fog the humid medium that is necessary to them, and the fog does not require for its formation the presence of a marsh in the locality. It results from the difference of temperature between two contiguous layers of air, whatever may be the cause of the cooling of one or of the warming of the other, subject to the condition that the air contains watery vapor. Aërial germs will grow in this medium as well as in the 'dangerous zone' of marshes, which, until further knowledge is obtained, will remain none the less, in my opinion, the origin of impaludism in the immense majority of cases. In insisting on the aërial marsh in Panama, I did not recall the *role* attributed to fogs in the Roman Campagna by Baron Michel and by Leon Colin, who regard the subject from different points-of-view. Although these works were already old, and although the influence of fogs has always been admitted in Algiers, from the first years of the occupation, as well as in Madagascar in the most recent experience, I was acting only on my own observation and on the testimony of the officers of the Canal service; but I am happy to find support in the opinions of learned *confrères*, although they are differently founded from my own. It is not, let us believe, by 'condensing the miasmatic vapor in the lower strata of the atmosphere' that the nocturnal cooling increases the intensity of the miasm, but in creating the aërial marsh (fog) in which germs may undergo their development. It is not necessary that the germs should emanate from the soil itself, that they should come in the state of *entirety* from more or less marshy neighboring regions; but such a soil may be more favorable to them, because, being moist, fertile or mountainous, it furnishes more humidity to the air; or because, being naked, flat or dry, its radiation is greater, and by giving more heat to the lower strata of the atmosphere it increases the thermal variations between day and night.

"This interpretation does not simplify the question of malarial hygiene, and I can conceive that sanitarians may have regarded the conclusions in a certain sense desperate. It is not, however, unimportant to face the evil where it really exists. I have never favored a system of morals or of therapeutics which did not begin by seeking out the sore spots to give them better care; and if, in a given locality, impaludism has its centre of action in fog, aside from the necessity for giving protection against the fog, it is not always impossible to modify the conditions of the soil which favor its formation.

"Where the restricted area of a marshy country has permitted us to attack it rapidly and to conquer it by a single effort, success has almost always been achieved: Either (*A*) by the direct drainage of the ground, by open canals or by underground conduits, like the system of drainage which has made healthy the environs of London and the principal districts of England; or (*B*), on the contrary, by flooding, which transforms the marshy surface exposed to the heat of summer into inoffensive drowned marshes, the means anciently employed by Empedocles, who rescued the Selcuntians from a cruel epidemic by discharging the water of a river over the marsh that surrounded their city. In the same manner, Lancisi arrested the development of an epidemic caused by the exhalations of the moat of the fort of San Angelo, and that frequently Hollanders have in like manner stopped the attacks of intermittent fever;[3] or (*C*) by filling the depressions of the marshy soil with solid materials, bringing it to a uniform level, and suppressing the pond-holes resulting from inequalities of grade. It is only necessary to mention the good results that follow the regulation and diking of canals and rivers, measures whose neglect may occasion serious epidemics. The same may be said of accidental seats of malaria, which are frequently developed along the line of railways by the neglect of accumulations of water forming in borrow-pits established during construction."

Loomis says:

"Drainage is another means which diminishes, and, in certain conformations of soil, entirely destroys malarial generation. In the majority of marshes, this generation can be arrested or prevented by free drainage."

A case of the creation of malarious conditions by an obstruction of natural drainage was fully set forth in 1862 in a trial held before the Superior Court at Pittsfield, Mass., between the town of Lenox and the Smith Paper Company of the adjoining town of Lee. The paper company had raised its dam and flooded a large tract of river-bottom that had previously been dry. In dry seasons, when the flow of the river was insufficient for its uses, the company used the water thus stored, thereby exposing large tracts of the flooded land to the action of the sun and air. The flooding had the further effect of

[1] Continued from page 247, No. 700.

[2] "*Chantiers de Terrassements en pays Paludeens*," par L. Dr. Ad. Nicholas, Paris, 1889.

[3] It was thus in 1718, during the War of the Succession of Austria, that the Hollanders inundated their kingdom for defence. At the beginning of the summer, which was excessively hot, preliminaries of peace were signed and the waters were drained off. Thereupon a serious epidemic was developed, and the States General ordered a new inundation until the beginning of winter.

preventing the adequate drainage of lands lying adjacent to the extended water surface, and converted these into swamps. This was accompanied by a serious outbreak of malarial fever previously unknown in that district, which led to the trial. The unfortunate error was made of bringing a criminal suit against the company for maintaining a nuisance, requiring for its success the unanimous verdict of a jury of twelve men, each of whom must be convinced "beyond a reasonable doubt" that the cases of illness described had been caused by a condition clearly resulting from the raising of the dam.

Dr. Adams's paper[1] concerning this case, after summing up the testimony on both sides, continues:

"The closing argument for the defence was made by Judge Soule. He called attention to the difference of opinion among the medical and sanitary experts as to the causes of malaria, which rendered it impossible, he contended, to fix the responsibility for the sickness at New Lenox upon the defendants' dam. He quoted from the testimony of nearly all the experts that the malarial poison is introduced from without, and is prevalent in epidemic form over a large region of country. He showed that only about half the witnesses had noticed any bad smells in the vicinity of the reservoir, whence he argued that the fact of smells had been exaggerated. Finally, he referred to the importance of the interests involved, and said that the result of removing the defendants' dam would be to stop the busy wheels of Lowell and Lawrence.

"The District Attorney, in closing for the Commonwealth, quoted from the testimony of witnesses to show that before the dam was raised the amount of boggy land was very small, and produced grass; that the 'pockets' were dry, the water clean, and the locality a very healthy one. The raising of the water-level, caused by raising the dam, made the valley swampy, caused water to stagnate in the pockets, and converted a healthy valley into a foul marsh, where malaria found its natural breeding place. The sufferings, loss and general deterioration of the community, resulting from constantly recurring attacks of fever and ague, were well depicted. The remarkable changes of opinion on the part of certain experts for the defence were not overlooked. He also showed that all examinations of the reservoir and measurements of the depth and fluctuations of the water, testified to on behalf of the defendants, were made during the present year [1882], when the supply of water has been abundant, and the bottom has been hidden from sight. He contrasted this condition with that in 1880, when, in consequence of drought, a great expanse of marshy bottom was for months exposed to the sun and air, and the deeper portions kept alternately wet and drying, which condition is liable at any time to recur.

"Judge Brigham, in his charge to the jury, explained those legal and technical points which were calculated to confuse and perplex, and placed the essential points in the case in their clearest light. He did not especially favor either side of the case, but left it for the jury to decide from the evidence whether or not the defendants' dam had been proved a public nuisance and a cause of the prevalence of intermittent fever in its vicinity.

"The jury, after being out twelve hours, brought in a verdict of '*Not Guilty*.'"

This was not a verdict justifying the raising of the dam, nor against the probable injury resulting from an obstruction of the natural drainage of the land. It was only a verdict that the causation of malaria and the method in which the condition of these lands had caused malaria in this case had not been so established "beyond a reasonable doubt" as to warrant the conviction of the Messrs. Smith on a criminal charge. Although there is a general concurrence of opinion on these matters, there is to this day no such positive and unquestionable knowledge as would warrant such conviction. I was an expert on the side of the Commonwealth in this case, and I felt satisfied that not one of the experts on the side of the defendant would be willing to assert that the conditions under consideration had not better be avoided.

The suggestion was made some years ago by Dr. Bronson, of New Haven, though not in distinct terms, that malaria may be transported from one locality to another through the medium of population. He refers to its failure to reach certain localities suitable for its development because there were no habitations to serve as stepping-stones for its progress, the idea obviously being that while malarial germs may not be transported for a considerable distance by currents of air, they may be carried in the person of one who has contracted the disease in one locality to ground elsewhere favorable to its development. This idea is not generally accepted, nor can it now be proved to be true. There is nothing in the history of the progress of the affection by slow stages over long, continuous reaches of country to controvert it. So far as malaria has followed the progress of railroad construction, for example, it may have been caused by the successive development of malarious conditions as the work extended. This, however, does not satisfactorily explain such a movement as that along the line of the New Haven Railroad from New York, and up the Connecticut River valley as far as Vermont and New Hampshire, the movement taking place long after the completion of the roads.

All observations as to the development of malaria and as to its elimination, while conforming more or less completely to the theories of all the different authorities, tend only to confirm the opinion that, so far as nearly the whole area of the United States is concerned, this development is in close relation to *undue soil-moisture* and to the undue prevalence of fogs or mists resulting therefrom; and that by drying the soil, and thereby greatly reducing or entirely removing mist and fog, we invariably reduce the intensity of malaria or remove it altogether. There is but one known means for effecting this change; that is, by removing the excessive moisture of the soil both by underdrainage and by such a regulation of the surface as shall prevent the accumulation of standing water in or on the surface-soil; that is to say, the sovereign remedy for malaria is drainage — not necessarily a thorough drying of the soil to a great depth, but only such as will bring it to its best agricultural condition.

The limits of temperature often assumed to control the development of malaria have not been fixed with certainty, nor do writers on the subject agree as to what the necessary degree of heat must be. We have ample evidence that the autumn temperature, even of our more Northern States, is sufficient, if other conditions are satisfactory, and if the germ is present; that is, if the soil is infected, for it may be safely assumed that, like many other prevalent diseases, malaria is due to a living germ, whether the *bacillus malariæ* or another. It has been sufficiently shown that what was long regarded as an essential factor, that is, the active decomposition of organic matter, is not indispensable. Many soils poor in organic remains are peculiarly pernicious if sufficiently moist and warm; while many swampy localities, of which the soil is made up almost entirely of decomposing vegetation, do not necessarily produce malaria. If in the condition of actual saturated swamps, they are much less likely to produce it than are soils of which the organic matter is less in quantity and in a much less active state of decomposition, but which are still far from being saturated. The malaria-producing capacity of large areas in California in which organic matter is not a prominent element of the soil, wherever irrigation is applied, sufficiently illustrates this.

In 1878, I made a sanitary survey of the east bank of the Hudson River between Dobbs Ferry and Tarrytown, where, at that time, there was a considerable prevalence of fever-and-ague. The following is extracted from my report in that case:

My observations were made chiefly with reference to fever-and-ague malaria. It must be stated at the outset that we are practically without knowledge as to the causation of this disease. There are, however, grounds for adopting a somewhat definite theory about it. It seems clear that to a certain extent the disease, which may originate in specially unhealthy places, propagates itself slowly through human agency.[2] It is a well-known fact that it has gradually spread from its earlier centres, and extended for a long distance into districts where it was previously unknown. Instances of this are too familiar to need recounting. In like manner, districts where the disease formerly prevailed, and where it had originated spontaneously, have been made by drainage perfectly healthy. For example, the fens of Lincolnshire, in England, and marshy districts along the lower Thames, were formerly greatly scourged with fever-and-ague and with malarial neuralgia. The extensive drainage operations carried on in these districts have had the effect of removing these ailments entirely from wide districts where they had formerly prevailed with the greatest severity.

The investigations thus far made lead to the following belief concerning the point which chiefly interests such localities: Assuming that fever-and-ague is indigenous, or that it has been brought to a locality by the movement of population, it seems clear that it propagates itself only under the influence of certain conditions of atmosphere, which are produced by undue soil-moisture, by the excessive decomposition of vegetable matter, and by the stagnation of the air caused by dense planting, and by the absence of sunlight.

Assuming, as I believe one may safely do, that fever and ague is not indigenous in the Irvington neighborhood, but has been brought to it, so far as it exists there, by the importation of cases of the disease, we have to look for such local conditions as would foster it and lead to its reproduction and localization.

So far as my examination warrants me in forming an opinion, I should say that there do exist, more or less throughout the whole district examined, sufficient resting-places for the infection, associated with conditions which would naturally lead to its propagation. I think it may be safely assumed that a detailed examination of the ground would lead to the discovery of these unfavorable spots, and that it is possible to remove them. At the same time, it must be understood that this opinion is not based on positive knowledge, for such knowledge does not exist. All that it is safe to say is that, judging from the previous experience of the world, proper efforts would, in all probability, result successfully. There are two leading items which have influence on this question. Drainage and ventilation.

Drainage. — Except along the river, and about certain ponds some distance east from Broadway, there are few especially wet areas, but there are very many points where small bits of ground are too wet, and these are quite frequently so shaded from the sun as to be more than suspicious. Also, the prevailing passion for ponds, which often follow each other in quick succession along the lines of the brooks, is not without its bad influence. These ponds are often much too high with reference to the surface of the ground adjoining them; they are subject to become filled with silt and leaves; they are not always well supplied with fresh water, but are frequently fed with water from swamps about which it would be unsafe to live, and the brooks supplying them receive a good deal of organic matter in the form of leaves, etc.; in addition to all this, the filtration from

[1] *Boston Medical and Surgical Journal*, December 28, 1882.

[2] I now attach much less importance than I then did to the agency of the person in the spread of malaria.

these ponds is sometimes a source of a springy condition of the ground lying below them.

There are still some small areas and some large areas which, in the interest of the whole neighborhood, ought to be thoroughly drained. I judge that about one-half, or nearly that of the whole shore from Tarrytown to Dobbs Ferry is swampy for a greater or less width, the small bays cut off by the railroad being imperfectly drained, receiving much water from the upland, being subject to the rise of the tide, and often having considerable stretches of their bottom entirely uncovered. All of these conditions are unfavorable.

Ventilation. — Perhaps ventilation is not precisely the word to express what is here meant, except in the sense that what is needed is an abundant supply of fresh air and sunlight. The decomposition of organic matter in or upon a damp soil takes on a very different character, according as it is freely exposed to the circulation of air and to the sun's heat, or is covered either by water, by fallen leaves, by underbrush, by dense planting or by anything which may seclude it from the most active oxidizing influences.

It is an old but mistaken idea that it is hard to grow a tree and easy to cut one down. The reverse of this proposition is nearer the truth. Wherever prosperous humanity establishes itself there seems to spring up, as if by magic, a cloud of leafage and a dense growth of all manner of aburescent vegetation, while every appeal having for its purpose the restraining of this ground-cumbering growth is met by the most persistent opposition. Not only will trees and bushes and shrubs multiply and shut out acres upon acres from the sun's rays and turn aside every breath of air, but the trees and bushes and shrubs accumulate until they destroy each other's beauty to that degree that plantations fifty years old have generally lost their distinctive and picturesque character, and become a mass of cramped forest trees, without lower branches; or shrubberies in which no individual plants can be seen; only a mass of uninterrupted surface leafage. Any one who will examine a country-seat, which was noted for its fine planting fifty years ago, will find that unless it was specially fortunate in having a skilled landscape-gardener for its owner, it has lost its landscape beauty, and has become more like a primeval forest with bits of neglected undergrowth.

With due deference to one's present fondness for ample planting, and to the general disposition not to sacrifice this year's beauty for next year's gain, I must say that, in my judgment, at least one-half of the problem in question might be solved by a vigorous and vigorous use of the hatchet and the axe. I believe, too, that if this were more judiciously done not only the future, but the present beauty of the whole region would be as much improved as would its healthfulness.

My examination was too slight for me to specify many details. This can be done only after a careful and minute examination of the whole area.

Whatever view we may take of the theories of different authorities on the subject, we reach always the same practical conclusion. Fanciai and all who succeeded him down to the time of MacCulloch attach prime importance to paludal influence. Dr. Mitchell entertained the opinion that the causative agency of malaria is a cryptogam whose best development takes place under conditions favorable to the growth of the commoner fungi. Colin believes that malaria is produced with greater or less intensity in proportion to the inherent fertility of the soil, this being prevented from exhausting its normal strength in the production of useful crops, in other words, that it is due to a misdirected energy of the soil. Nicholas adheres rather more closely to the marsh-miasm theory, but believes that the germ produced by marshes and other wet or moist lands may become detached from them, and may propagate itself in and be transported by floating mists. These represent substantially all of the theories that are accepted of one or another affection by those who have considered the subject. It is not necessary with a view to the elimination of malaria to determine whether one or the other, or more than one, of these theories are correct. They all lead to the practical conclusion, already stated, that the production and propagation of malaria are favored and apparently controlled by the presence of atmospheric and ground-moisture, and the conclusion is accepted by all that, in the reduction of the amount of the moisture, the power of production and propagation is destroyed or greatly lessened.

Drainage is the chief agent by which this is to be effected. As an accessory means to this end, much importance is to be attached to the prevention of aërial stagnation by the removal of undergrowth, shrubbery, etc., in order to facilitate a free sweep of currents of air over the surface of the ground.

There are large areas in different parts of the country where, without the presence of actual swamps, there are marked indications of the undue accumulation of water, and where these conditions seem to give rise to malarial influences. They exist in many cases where, for financial reasons, it would not be practicable to secure anything like a thorough drainage of the land. Frequently, hundreds of acres scattered here and there, and occupied by worthless forests or brush, and where other conditions prevent improvement for agricultural reasons alone, would require much less costly treatment.

There is no doubt that in a great number, perhaps in the majority of such cases, effective surface-drainage would secure a vast improvement. I have recently had occasion to recommend such treatment with reference to a large tract in Alabama, where there is so little difference of level that the flow of storm-water is not only retarded by slight elevations between low areas but is not carried away even where the fall is continuous, though slight and circuitous, because of the absence of a suitable channel of discharge. There is no outlying water-shed to accumulate storm-water in such volume as to erode a channel, only a general accumulation of the rainfall of the whole district in slight depressions scattered here and there over it. A study of the elevations of different parts of this tract shows that it would be easy and inexpensive to run a main ditch on a course traversing a large, continuous range of these depressions, adequate to the immediate removal of all storm-water reaching them; and to grade down, in the form of swales, outlets leading from isolated pockets to, or to the vicinity of, this ditch. The general rule adopted is to furnish free drainage-way from every part of the area at a depth of not less than one foot below the lowest part of each depression, and to give the main channel a fall of not less than five feet per mile.

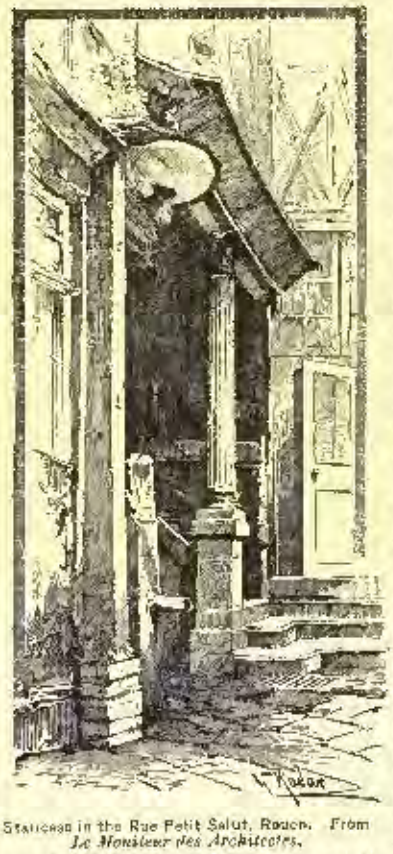
It is not necessary for the purpose now under consideration to make the channel so large as to secure the immediate removal of the water of heavy storms without overflowing the banks. The purpose is not to put the land in good condition for agricultural purposes, nor is there for the present end any objection to its being submerged for a short time. The point in view is simply to make sure that all storm-water falling on the whole district shall be steadily and surely removed, without lying at any point for a sufficient time to make it sodden or to change the character of its vegetation. As an accessory improvement, I have advised the clearing out of all bushes and the thinning out of wooded tracts, so that wherever possible free access may be given to sunlight and everywhere to the circulation of air.

The foregoing covers a rapid review of the various facts and theories connected with this subject so far as they are applicable to the present purpose. They all lead clearly to the conclusion that whatever other incidental or accessory conditions may influence the problem, the underlying factor, at least, in our climate is, in all cases, one which may be eliminated or rendered relatively unimportant by such improvement of the condition of the ground as can be effected by drainage, or, in some cases, by cutting off water by which the ground is saturated.

The required improvement is to be effected probably in all cases by carrying out precisely those methods of drainage which would be necessary for agricultural improvement. There is, therefore, no occasion to recite methods here, only to make reference to the previous chapter, and to other authorities on the subject of agricultural drainage.

GEORGE E. WARING, JR.

ROMANTICISM IN ART.



Staircase in the Rue Petit Salut, Rouen. *From Le Moniteur des Architectes.*

AT Messrs. Dowdeswell's gallery in New Bond Street there was recently shown a representative collection of the pictures of the great French painters who fought the battle against academicalism some fifty or sixty years ago. Called Romanticists rather because they belonged to the set of romantic poets — Hugo, de Musset, Gauthier and Berlioz — than for any particular appropriateness of the term to their own work, they were, in fact, realists, impressionists and naturalists. The movement was a revolution against conventionalism, a determination to take Nature as guide and paint her truthfully. There is beauty and charm of a high order, added to extraordinary poetic feeling, in the work of Claude le Lorrain and Gaspar Poussin; but it is not Nature as we all see her from day to day. Watteau, Oudry, Desportes and Chardin had all in their several styles been more or less naturalists; but their successors, the sentimental and weak Greuze, the over-Classic and cold Prud'hon (refined and graceful though some of his works are), the hard and stagey David, and, later on, the stiff, woodeny and intensely uninteresting Ingres, looked upon Nature with contempt. To paint what they saw was beneath the dignity of academical eyes. But a band of innovators appeared, headed by Delacroix, who determined to paint the true instead of the false, whether or no they suffered thereby. Suffer they did, for Delacroix, at the commencement of his life, had to concoct a frame with his own hands, being

too poor to buy one; Millet, later on, only just managed to keep himself going; and Diaz, Daubigny, Decamps and Rousseau were very poorly appreciated by their contemporaries. Even Corot was only admired in a sort of half-hearted fashion—Louis Napoléon being accredited with saying that perhaps Corot's effects were true, "but, for his part, he had never been out early enough in the morning to see Nature enveloped in these silvery mists." And now what is the fact? People are willing to give thousands for the smallest and most inferior work of any one of these masters. Grand were they as colorists, poets were they in feeling! but it is heartrending to walk round these galleries and see the mere sketches which are now valued at thousands of pounds, and reflect that, fifty years ago, masterpieces by the same men could be bought for a few hundred francs. The painters have gone into silence; they left the world with broken hearts, sore and wounded for want of a little sympathetic recognition from a blind and stupid public. Now that it is too late the public admires—and others profit. A picture by Rousseau, which was sold for 150 francs at a provincial exhibition during the painter's *jeunesse*, fetched in Paris, two years ago, 50,000 francs. And so it is all round. A thousand pounds is nothing for a Corot or a Troyon, and £20,000 is spoken of as a possible price for a Millet!

The exhibition at Messrs. Dowdeswell's included some fine Corots, a dozen or so of the still not-fully-appreciated Daubigays, and some examples by Troyon, Millet, Rousseau, Diaz, Dupré, Delacroix and Decamps; and, of the Dutch school, several by Israels, the three Maris, Mesdag and Mauve. It is a pity that some of Gérieault's sketches could not have been added, and that Bonnington (much more French than English) could not have been represented, though we have had the opportunity of seeing the latter at the Grosvenor during the winter.

This collection must be a revelation to the mass of Londoners, for many of the painters are rarely seen here. Corot, with his silvery tones and feathery trees, his nymphs dancing on the green banks of the Seine at Neuilly and Asnières, is pretty familiar to most English people, but the beauty of Daubigny's gray river scenes (mostly the Seine and Marne), his golden sunset hues, his placid pools, are only known to those who are old enough to remember them *aux Salons d'autrefois*. Diaz is almost unknown—his marvellous coloring, his extraordinary versatility, being alike at home in landscape and the figure. But Diaz is somewhat of the conventional old master, as compared with Daubigny, Corot and Troyon. What a marvel, too, is the slightness of the work of these men. As a lady remarked, "They don't look finished!" But who wants "finish?" Is not a tree of Corot's the perfection of painting, although the leaves look as if they were blown onto the canvas by a gentle breeze?

Whether Millet is not as much overrated now as he was depreciated during his lifetime is a question. His sentiment is charming, but his drawing is often rude; and, even in the former quality, he does not approach that poet of sadness and poverty, Israels. One of the interiors in this exhibition might almost be a De Hoogbe, while his "Boys' Swimming Boats" is an idyl of the sea-shore.

Amongst the Dutchmen, the landscapes of W. and I. Maris are charming in their realism; and, for those persons who can see poetry in pictures of cattle and sheep, there are the works of Mauve and Van Marcke.

The collection included two Meissoniers (another of the overrated artists, time will probably show) and a Gérôme—Frederick the Great playing his flute in mud-splashed boots, and surrounded by hounds and other properties in splendid disorder—a picture which must rejoice the hearts of the lovers of "finish" and "detail."

Monticelli is another of the unappreciated masters of color; but it may be questioned whether the Gérôme will not meet with many more admirers, even now, than the former's marvellous work.

Messrs. Dowdeswell deserve the thanks of all lovers of French art for bringing together this fine collection, and it is to be hoped that the fallacy that France has never had any first-rate landscapists may at last be exploded.

A propos of fallacies, I see that French *aquarellistes* will be represented at the International Exhibition, and I hope that English people—critics, as well as the public—will cease to affirm that "water-color is not understood in France." To my mind, *aquarelle* is far better understood in France and Holland than here; for it is pure water-color, not body-color, nor is the work niggled and stippled up. Let any one compare the work of some Dutchmen now on view at the Fine Art Society's galleries—Roelofs, Bosboom, Weissenbruch, Josselin de Jong, Basterl and Tholen—with that of Paul Naftel in the same rooms, and I think he will agree with this statement.

S. Beale.

Still Wax for Building-Paper.—Rosin, as used in building-paper, is being largely replaced by a petroleum product called "still wax," or "wax tailings." An important advantage in the use of this petroleum product, in connection with paper and fibrous substances, consists in its non-liability to oxidize, and thus produce spontaneous combustion. Moreover, it is said to toughen with age, instead of growing more brittle, like resin and coal-tar pitch. It is not more combustible than resin; it burns slowly, with a dull flame, producing immense quantities of lampblack of fine quality. It melts rapidly at 200° Fahrenheit, and in that state combines perfectly with resin, asphaltum and warm oil. Its use is, therefore, expected to increase largely.—*Manufacturer and Builder.*

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF GRANGE SARD, ESQ., ALBANY, N. Y. MR. H. H. RICHARDSON, ARCHITECT.

[Gelatine Print, issued only with the Imperial Edition.]

HOUSE FOR E. J. BARNEY, ESQ., DAYTON, O. MR. S. S. BEMAN, ARCHITECT, CHICAGO, ILL.

This house is built of red Portage stone.

ALTERATIONS TO BUILDING OF THE NEW YORK CLUB. MR. H. H. ROBERTSON AND MR. A. J. MANNING, ASSOCIATED ARCHITECTS, NEW YORK, N. Y.

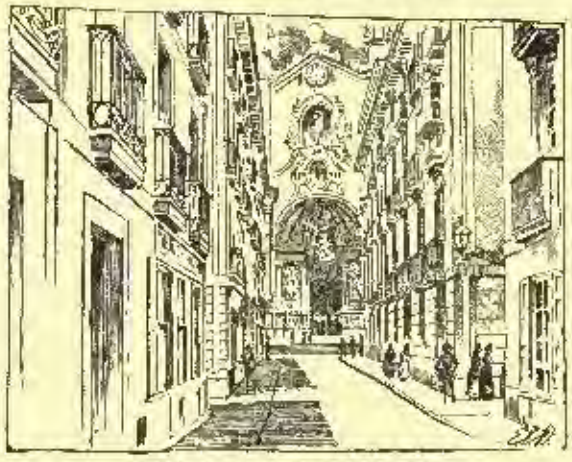
BAPTIST CHURCH, MALDEN, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

BUILDING FOR THE BERKELEY CO., BERKELEY, R. I. MESSRS. STONE, CARPENTER & WILLSON, ARCHITECTS, PROVIDENCE, R. I.

SPANISH SKETCHES.

IN THE BASQUE BORDER-LAND.

"Fair land! of chivalry the old domain,
Land of the vine and olive, lovely Spain!"



The Cathedral Front, St. Sebastian, Spain.

If one were obliged to give a reason for every journey, then one might stay at home. But surely, if one need an excuse for going anywhere, it may be found in Spain. Assuming this, let us journey thitherward, following the route of travel through England and France, and across the Pyrenees.

Fortunately, the progression of events in times past has coincided with the march of progress in times modern. That is, we may enter Spain by rail and still follow the line of conquest, or re-conquest, that gave Iberus to the Goths and Hispañia to the Castilians. Should it be preferred, however, to enter Spain with the Africans, who invaded the country in the early years of the eighth century, then we may take steamer, occasionally, for Gibraltar and Malaga; or if we would explore with the Phœnicians, then at Cadiz, that city on the coast of Tarshish. The northern entrance is the more preferable, especially in the summer months, on account of many things hereinafter to be mentioned. The sea-service, of course, to Liverpool or Havre, is more regular and comfortable than to the ports farther south. Once in Paris, we find several routes open to the tourist, and even reasonable "excursion rates," to every important city of the Iberian peninsula.

We may go by rail to Marseilles, thence by steamer to Tunis or Algiers, skirting the north coast of Africa to Oran, whence to Carthagena, Malaga or Tangier (as the ticket may read), returning *via* Cadiz or Malaga, through Granada, Seville, Cordova, Toledo, Madrid; or, direct to Barcelona, Tarragona, Valencia and Southern Spain, to Madrid, etc., or *vice versâ*. Another route, and that I shall now follow, carries one from Paris to and through Bordeaux, Biarritz, and beyond this delightful resort, through a gap in the Pyrenees, to San Sebastian, Burgos and Madrid. I would not seek to deprive the subject of any of its charm of distance, either real or imaginary, nor to rudely tear away the veil of history, romance and poetry, that cast a glamour over its rugged features. But the truth is, Spain is no longer at a distance; it is many years since its capital

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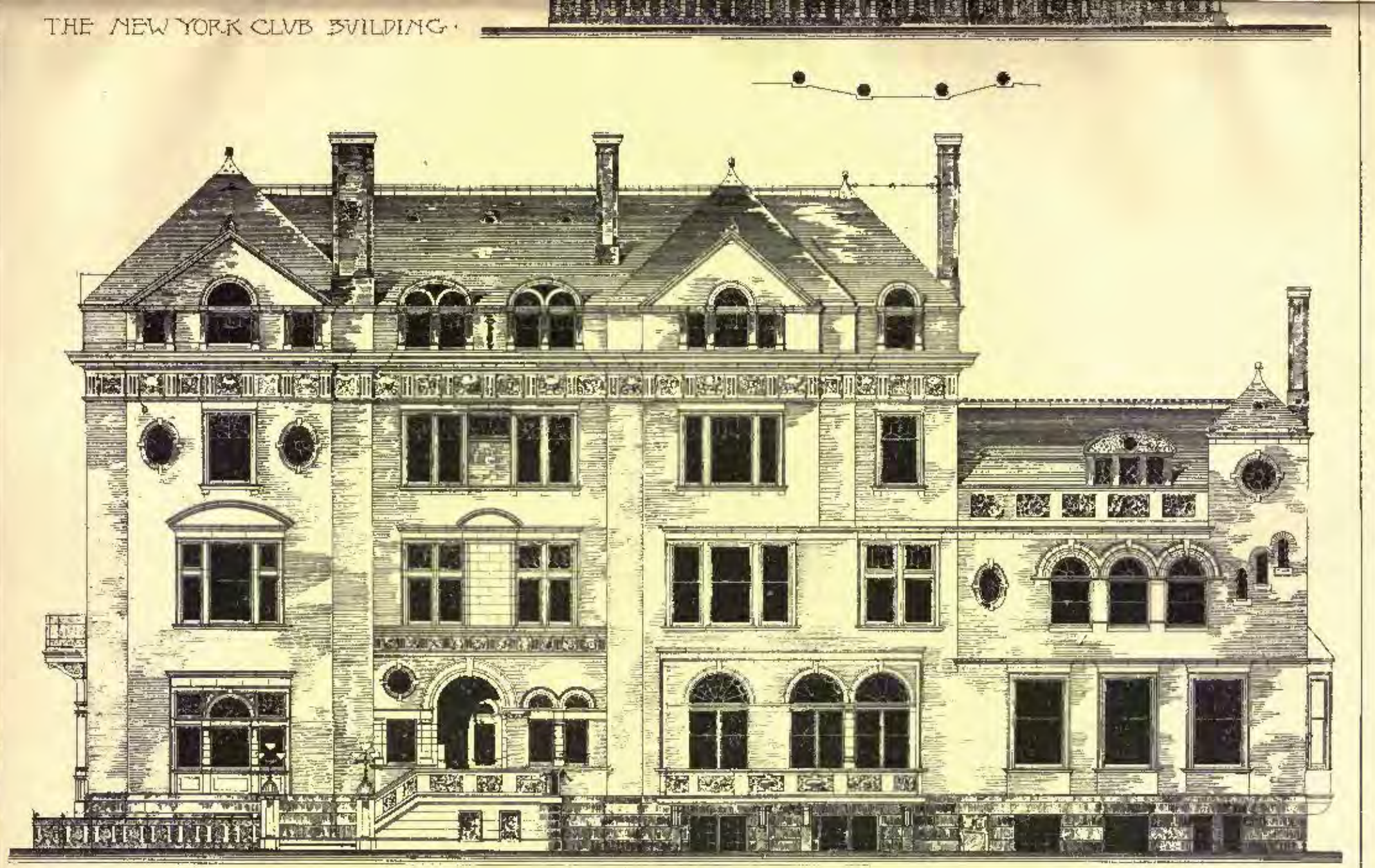
THE NEW YORK CLUB BUILDING.



35th Street Elevation.

R.H. Robertson, J.J. Fanning, } Associated Architects.

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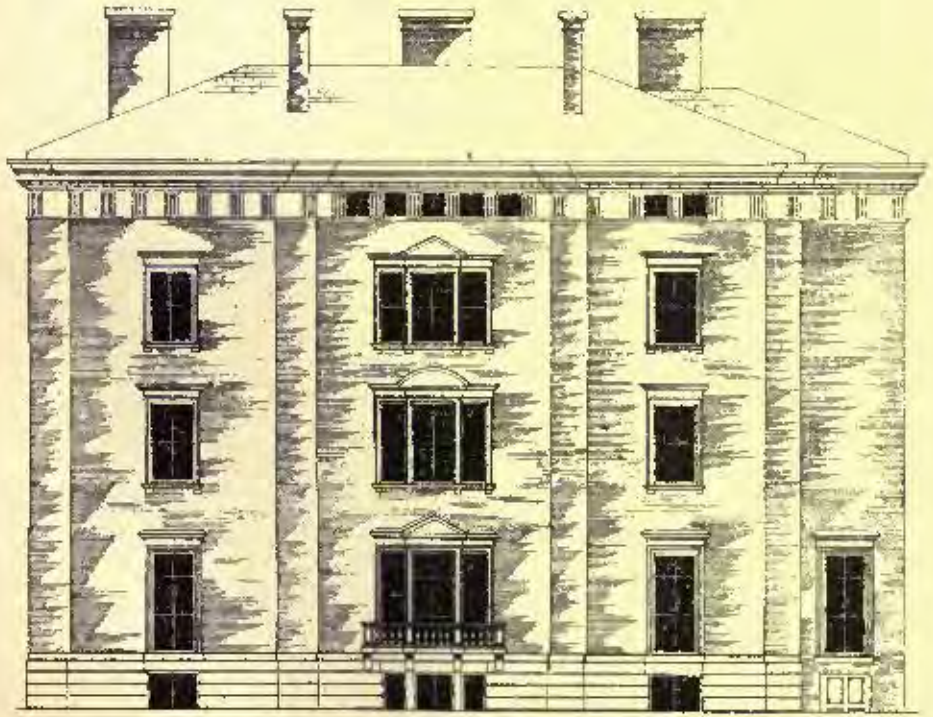
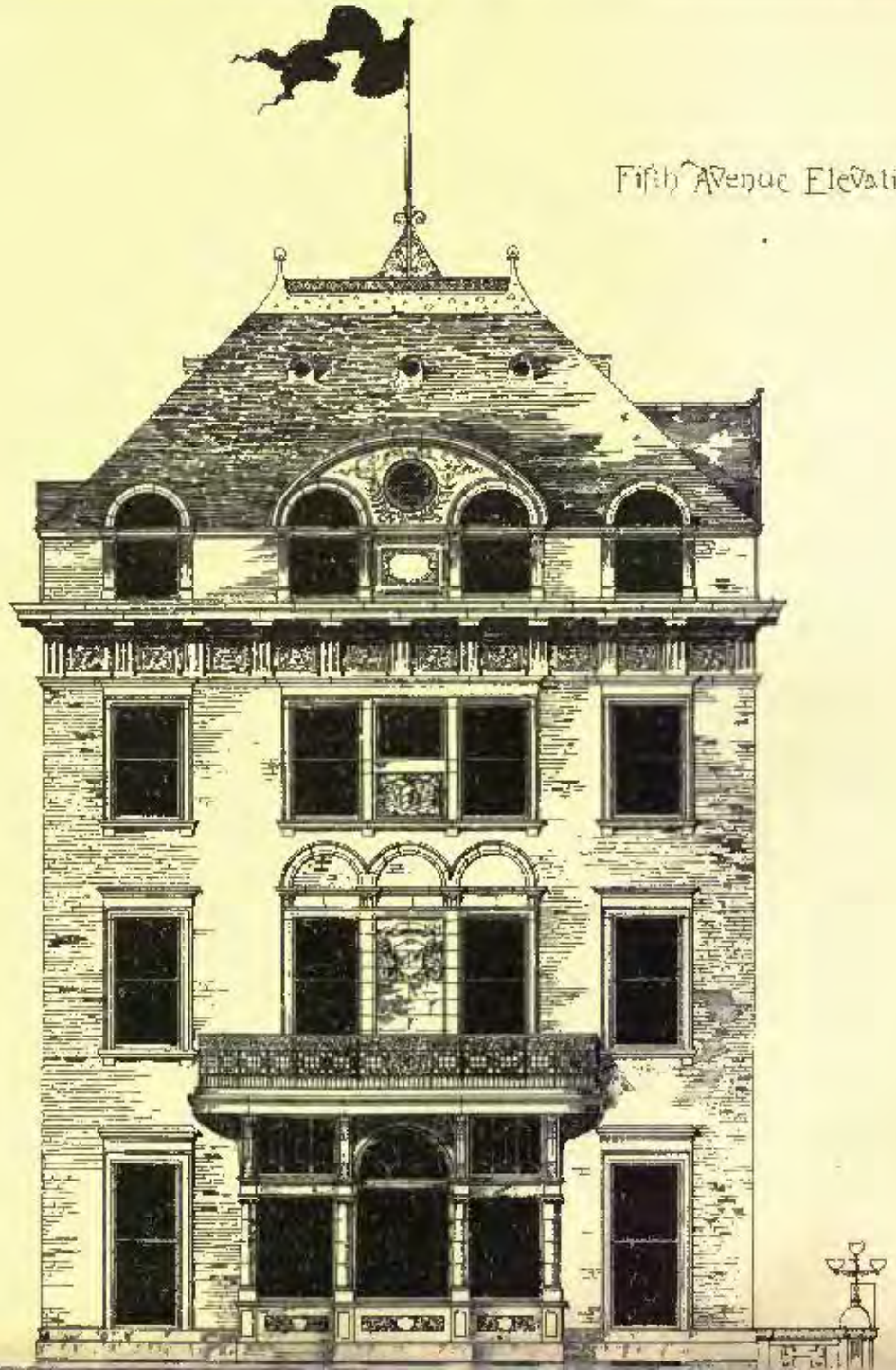


ALTERATIONS



Fifth Avenue Elevation.

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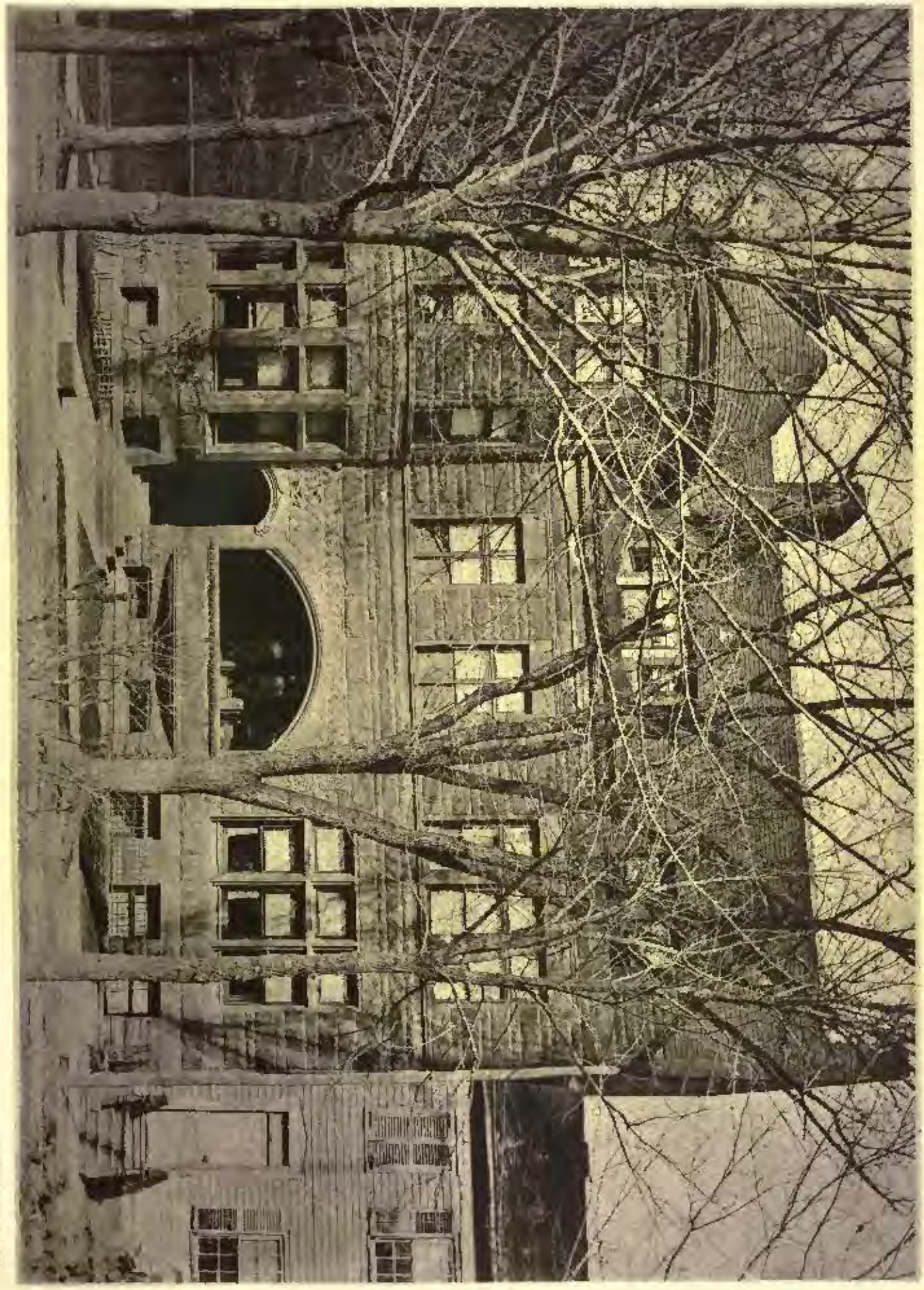


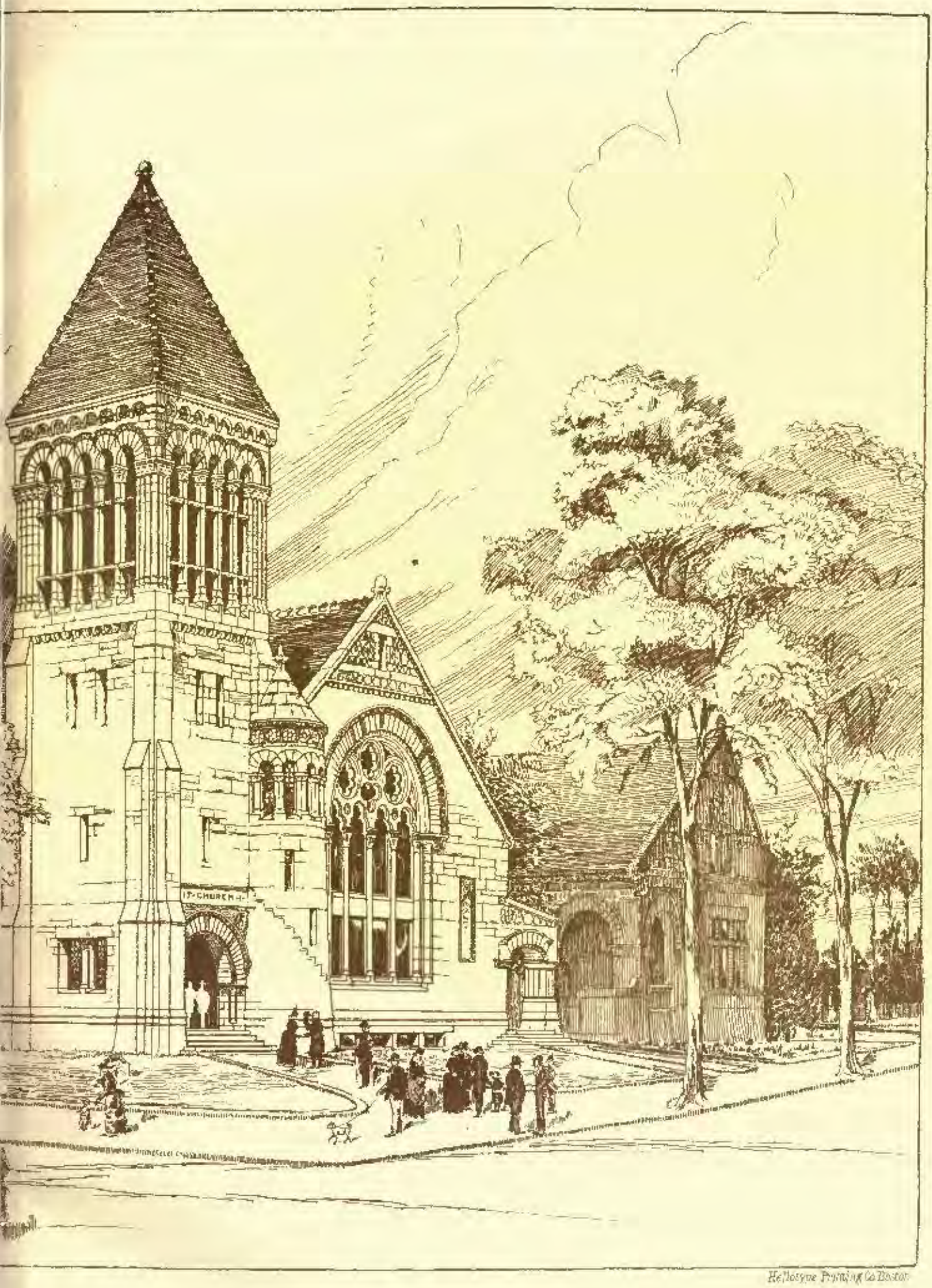
HOUSE OF GRANGE SARD, ESQ., ALBANY, N. Y.

H. H. RICHARDSON, Architect.

HELIOTYPE PRINTING CO., BOSTON.

SKETCH FOR NEW BAPTIST CHURCH AT MALDEN MASS

SHEPLEY RUTAN & COOLIDGE ARCHITECTS



Heliotype Printing Co. Boston

American Architect and Building News, June 1 1889. No. 701

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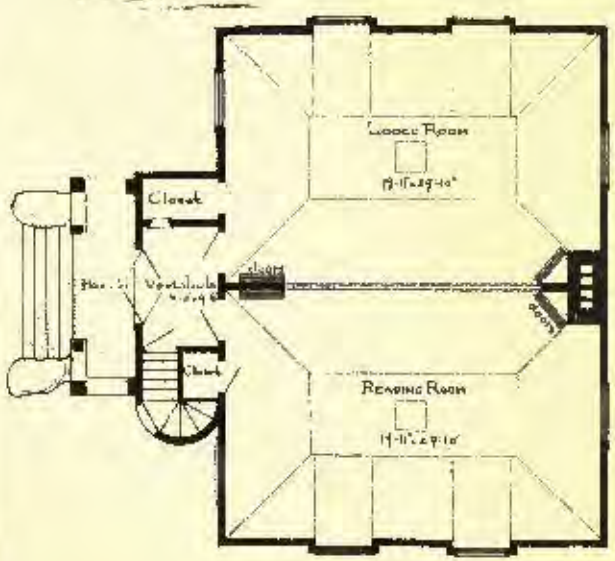
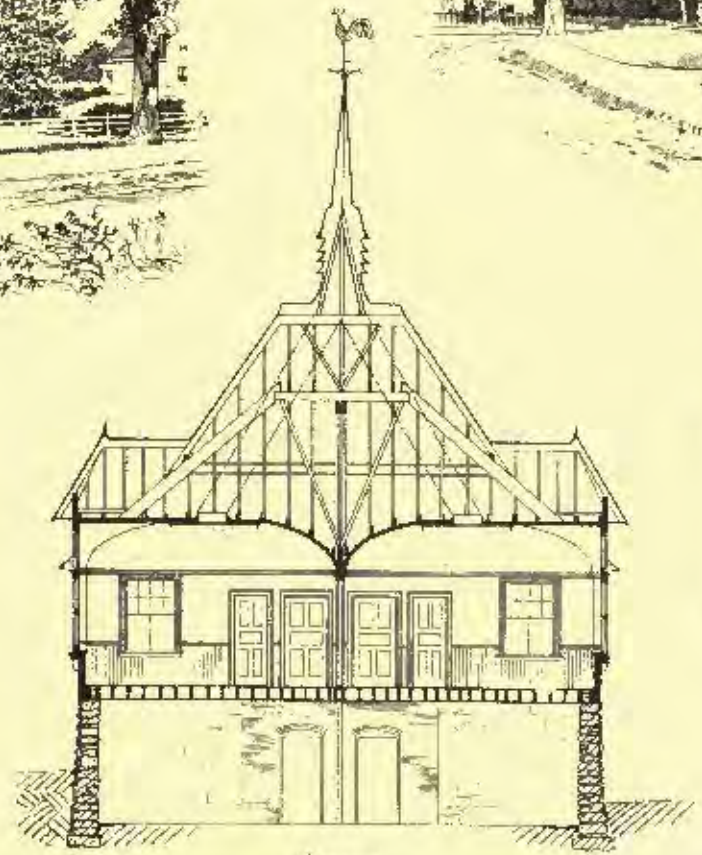
Building at Berkeley, R.I.

for the Berkeley Co.

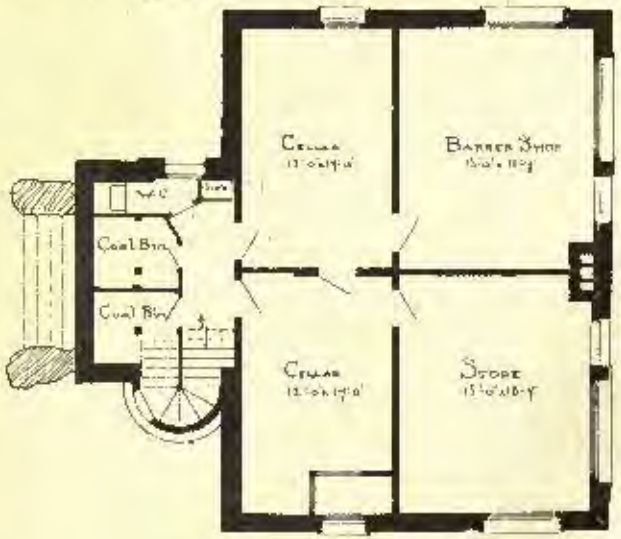
Stone, Carpenter & Wilson, Architects, Providence, R.I.



First Story Plan



Section.



Basement Plan

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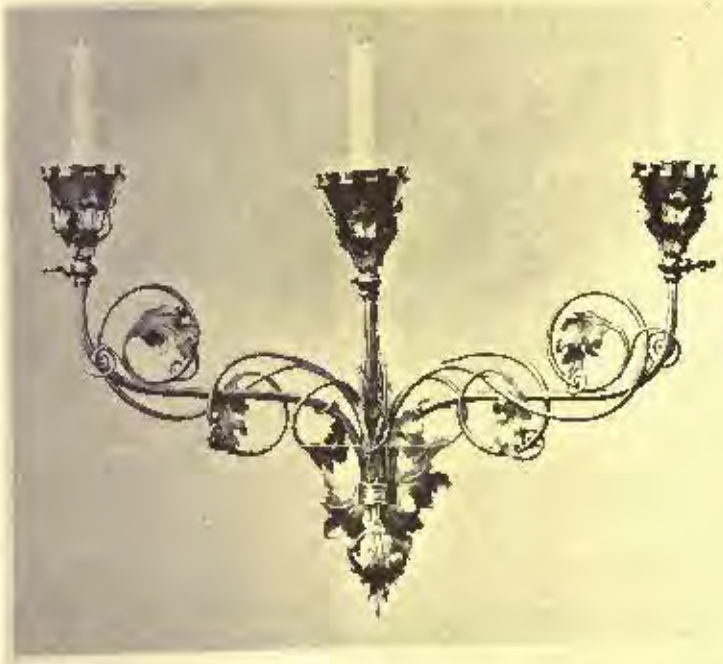


HELIOTYPE PRINTING CO., BOSTON

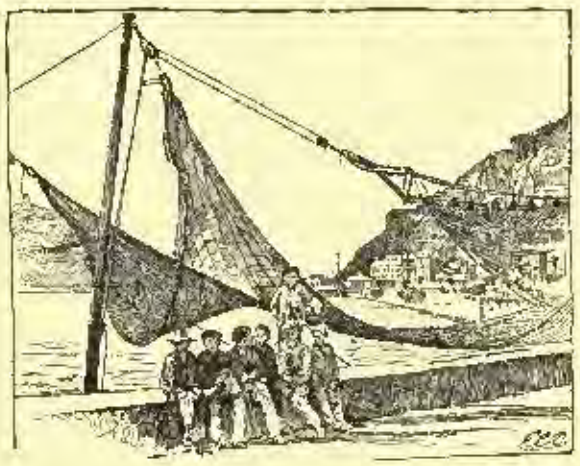
SECTION OF ALTAR-RAIL.

ADVERTISING PAGE.

WROUGHT IRON WORK
BY
JOHN WILLIAMS. { 514-556 WEST 27th STREET. / FORMERLY AT 115-121 EAST 13th STREET. } NEW YORK.

was united with the chief centres of Europe, by rail, though the travelling public has been slow to find it out. Yet, the iron-horse has not invaded the country in the ruthless manner that is his wont elsewhere. He has at no time shown a tendency to play the rôle of iconoclast, has destroyed no monuments, has not even soiled the cherished relics with his smoke. The jealous provision, that stipulated for a trans-Pyrenean track of different gauge, also provided that no locomotive should enter the precincts of a city. So it is, that the iron-steed pants at the portals, impotent, and glares at gates he cannot pass beyond. Once beyond the mountain-wall that divides France from Spain, we find a delightful halting-place at San Sebastian, a coigne of vantage whence we may sally out at leisure upon the richer fields of the South. So near the frontier as it is, its superficial character is French, as evidenced in the blocks of buildings along the boulevard, the hotels, on the French plan, and their servants, with French airs and mannerisms.

But it is an agreeable city, this Basque capital, clean and attractive, with a wide-awake air wholly its own, a brisk individuality, strikingly at variance with the somnolent habit of the cities beyond. As is well-known, doubtless, it lies in the centre of the country of the Basques, a people who have preserved the language, the customs and traditions of most ancient times. Their province is an unconquered one, left undisturbed by Vandals, Goths and Moors. Hence it is, the Basques are arrogant yet simple, brusque yet courteous, well-grounded in the belief that their country was the first created land, and their language, spoken by Adam in Paradise (Adam of Eden, you know), was brought here by Noah, or Tubal Cain, sole survival of the confusion of Babel. And do they not believe that Ararat was a peak of the Pyrenees, and their hill-tops were the first to emerge from the wild waste of waters? There is little a true Biscayan will not believe, provided it goes to swell the prestige of his ancestors. Primitive enough, this speech is, and it may have been, as certain

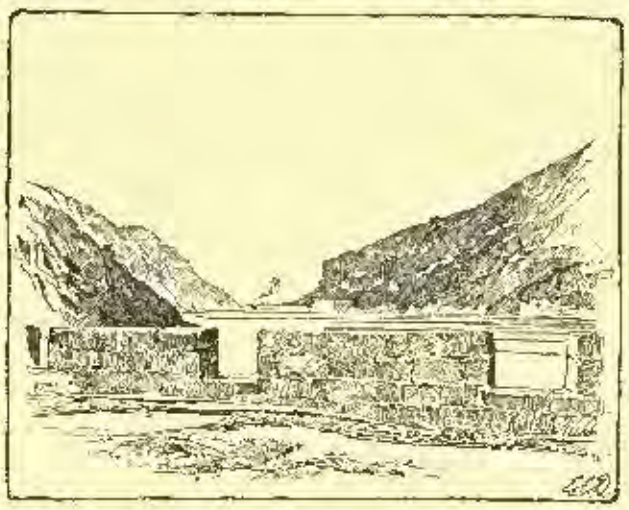


philologists claim, once the universal idiom of Spain. They will repeat with glee the statement of the Frenchman, that they cannot even understand each other, and that if they write, for instance, Solomon, they pronounce it Nebuchadnezzar. And finally, did not the arch enemy of man, *el Diablo*, wrestle with the language for seven years, and then give it up in despair?

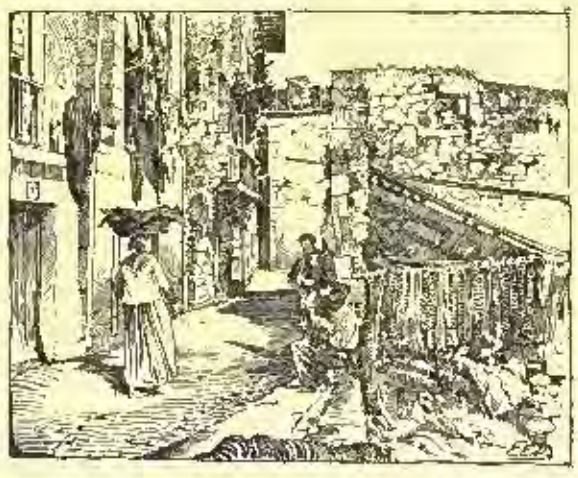
Though the streets of San Sebastian are mainly broad and straight, yet there are narrow ones here and there, that wind tortuously up the hill and lead to nooks attractive. Such a one is that in front of the cathedral, which is buttressed by the older buildings of the city, and where the façade of the holy structure terminates the vista. Enter the cathedral, and you find it not much different from others grander, and not nearly so distinctive as the little church of Pasagés, a few miles distant. That, certainly, is Basque, in all its appointments. Besides the ordinary ecclesiastical furniture, which is scantily supplied, the floor is covered with low chairs or praying-stools, with arm-rest, and with little benches or crickets, wound round with coils of wax taper, fathoms in a coil apparently. These taper coils are placed above the tombs beneath the floor, and in front of portraits and images. Their ends sticking up, all over the floor, remind one of the heads of serpents, red and white, raised threateningly.

Pasagés, by the way, has a land-locked harbor, reached only by a narrow inlet, steep hills rise around it, and on their sides and on narrow shelves between them and the water, the town itself is built. It was formerly rich and royal, and many houses yet stand here with sculptured *escudos* or escutcheons, over their doorways. Ruined and decaying is this old city now, yet the harbor is as good as ever and as beautiful. From this harbor, tradition has it, sailed Lafayette, when he escaped from France, and came to America to offer his sword to our revolutionary ancestors. Journeying back to San Sebastian, we are beset by troops of children, all happy, apparently, and all playing seriously. In a nook under a cliff where a spring gushed forth, a crowd of *lavanderes*, or washerwomen were assembled, merrily mauling the clothes entrusted to their care, and entering with spirit into the fun of being photographed. For, my friend-of-a-day and myself carried cameras, and popped at everything picturesque by the wayside.

The chief attraction of San Sebastian is its beautiful bay, protected by castle-crowned hills, on the shore of which *La Concha*, "the shell," the wealthy and fashionable disport themselves the summer through. The Queen-regent, Christina, and the Spanish apology for a King, Alfonso XIII, even condescend to appear here and wet their royal limbs. The Queen, indeed, is a favorite here, because she is the mother of the King, and because of her own beaming presence. Above the town towers the principal fort, and a winding path leads away to it, with glimpses ever of bay and shore, green hills, white villas, harbored vessels, brown nets on white walls drying, and a glorious sweep of ocean out over the Bay of Biscay. The seaside slope is thickly strewn with graves, graves of English and French soldiers, who came here to fight over Spain, like two dogs over a bone, in the early years of this century. For this was



the last stand of the French, here at San Sebastian, before they were driven over the border, by the soldiers of Wellington, in 1813. A thankless task, that of the Iron Duke; though the Spaniards did reward him with an estate in Andalusia, which a degenerate descendant owns to-day. I fancy the English general would have had a different task, had Napoleon's hands not been so full elsewhere, and the best of his soldiers not engaged on other fields. As it was, the Duke played war for several years, with the tag-rag-and-bobtail of Napoleon's armies, throwing up earthworks like little hills all over Portugal and Spain, from which he would emerge at times, chastise a detached fragment of the French army, and then scamper back again to his intrenchments. But his policy won the victory in the end, though the final excesses of the Englishmen, drunk with wine and glory, were tenfold worse than the French occupation. After



the French had gone, even though they ravaged and ravished, Spain's wish sometimes seemed to be that they would return and deliver her from her deliverers. All are gone now; the sunken mounds and the mossy marbles on that hill sloping down to the sea remind us what fools there were in those days, who would spend thousands of lives and millions of treasure fighting for a country neither nation ever retained. The Spaniards, even now, speak of the French invasion and its barbarities with a shrug, but of the English deliverance with a grin. As we were engaged in focusing our cameras upon the tombstones, a herd of goats came up into the field of view, and one of them climbed upon a tomb and stood there, presenting an adornment not contemplated by the artist with satisfaction. Down the hill, also, came hurrying a soldier from the fort,

with positive orders for us to cease our efforts to secure photographs on that sacred spot. It was not out of regard for the defunct French and Britishers but for the law of Spain, that forbade the sketching of a frontier fortress.

It may not be amiss to remark, in this connection, that the Spaniards offer little opposition to the photographer. They are the most liberal of people; they have long since ceased to regard strangers with suspicion. Were this an account of the experiences of an amateur photographer, I might relate many adventures, for I consider myself one of the very first to take up photography as a pastime. Indeed, when I undertook to learn the art, that I might secure pictures of scenes not else obtainable, I was severely frowned upon, and the "artist" who acted the part of instructor charged me a good round sum for his teachings.

That was fifteen years ago, in 1874, and my first essay was in Florida, along the Indian River, and on Lake Okeechobee. It was the "wet process" that was in use at the time, and for a long while after; and wet it was on more than one occasion. I remember now as a nightmare the "dark tent" into which I had to crawl, on my hands and knees, after every exposure, and also to coat the plate, twice for each negative. It was made small, for convenience sake, and was hot and close, even to suffocation. It was a "wet" process, I said, as applied to the plate and the photographer, for the latter was bathed in perspiration every time he emerged into outer air. One of my experiences is indelibly stamped in memory, and for several weeks was indelibly stamped upon my person, and that was when, one day, in crawling out of my box, I upset the "silver bath" —a two-quart solution of nitrate of silver — into my lap. That I survived the terrors of that "dark tent" I attribute to a strong constitution and an overpowering love for adventure.

But to return to the subject of photographing and sketching in Spain. This interruption was the only one that occurred to me. I have carried my camera to churches, cathedrals, fairs and bull-fights, and have experienced no more difficulty than would arise from a good-natured curiosity.

In Cadiz, I even photographed the interior of a church while the people were at prayers, and the sacristan and chaplain aided me at

my work! I secured not only the picture I was after (a copy of the last painting of Murillo), but also the people kneeling in front of the altar. I did not consider it sacrilegious at all, for I did not understand the prayers, nor did the people understand what I was doing. It was with some anxiety that I prepared for photographing the bull-fight, for when the people's blood is up they will not allow any obstacle to their enjoyment of the gory scene. But, though greatly bothered by the crowding of the masses, and subject now and then to some good-natured criticism, I experienced no difficulty whatever. As a rule, the crowd at a bull-fight is gay and thoughtless. Even the stolid Britisher cannot irritate them, though his apparent indifference sometimes casts a gloom over the immediate vicinity of his person. But they resent nothing except an abridgment of the pleasures of the ring. They will insist upon the last horse as a sacrifice to *toro*, and the last, best hero of tauromachy in front of them.

To return to San Sebastian. The soldier who warned us away from the fortress had an air about him that seemed to invite a bribe, and I suggested to my companion that a *peseta* well placed might secure us all the exposures we desired. But she thought otherwise, and, sooner than expose her to ridicule, I did not place any coin in the Spaniard's itching palm. That it did itch, and that he was disappointed in returning empty-handed, one might see by his dejected air. A short time after, I had curious confirmation of the correctness of my views in Paris. In a collection of views owned by a dealer there I found some fine ones of the very fort we were forbidden to photograph. I asked the dealer how it was he obtained permission, and he said that it cost him but twenty cents. He described the scene in all its details with the gusto of a Frenchman in his skill at *finesse*: "You see, Monsieur, the *soldat* he stand by me with hees hand behind him, so! and I steep up and drop a franc seuto eat. Then the *soldat* he disappear ver suddang."

An artist, an architect, might wish to be informed of the possible material here in San Sebastian for a few days' study. I should think the Cathedral worth examining, and, at Passages, the quaint Basque church and the houses of the decayed nobility. For costume-sketches, the fairs and markets should be visited, and the amphitheatre where the Basque boys play that peculiar ball-game with basket-work bats — a game as popular there as base-ball is in America.

For scenery of a quiet kind, with rounded hills, curving shores, promontories fort-surmounted, and fields dotted with red-roofed farm-houses and villas, the whole bathed in soft light and delicious atmosphere, one may tarry awhile at San Sebastian. June seems to be the opening month of the bathing season, though earlier months are delightful for walks and rides.

This point is a good one for short excursions, but the railroad leads southward to other cities that are better situated as centres for extended exploration. You may, perhaps, reach the pass of Roncesvalles by hard staging, or turn westward along the shores of Biscay. In the hills, good trout-fishing is said to be found, and examples of what Spanish hills are like may be seen along the railroad through this province of Vascongadas on the way to Burgos.

Frederick A. Oben.

AUGUSTE RODIN.—IX.

RODIN'S DRAWINGS.

Figure from the Door. Auguste Rodin, Sculptor.

Only by some reproduction of process printing can any adequate impression be obtained of Rodin's drawings. Nearly all are in water-color, or black-and-white, a few only being in pen-and-ink. All of them have a big sweep of line, a great arrangement of mass, and are very — yes, tremendously put together. A great master is seen in the expression of light-and-shade, and in the composition of planes. They are as rich as a mosaic of liquid precious stones, and as palpitating as flesh itself. If their authorship were not known they would be justly accepted as the work of a great old master. In those composed with landscape there is the same deep sentiment of appropriateness as shown in similar compositions by Barye, as well as an imposing vastness of sea and plain. Many of them are preliminary studies of the figures on the door, and embrace, in subject, the full round of love's ever-varying expression: all sculpturesque, and all vital with emotion. The almost imperceptibly rendered sketch of the "Sculptor's Dream," has as much personal significance as it is beautiful in idea. The sculptor musingly works, while the shadows of his cherished fancies silently assemble around him. It indicates Rodin's entire life, and illustrates his whole character. He has lived in dreams, and his works are the embodied forms thereof. He proposes to execute this design for his own tomb.

RODIN'S ART AND LITERARY FRIENDS.

On the occasion of Rodin's first exhibition of his work in public in an art collection, some busts in Brussels, he found one intelligent and appreciative admirer among the art writers of that city, and the same good fortune attended the "Age of Brass" when it was shown there in the early spring of 1877. An occasional complimentary allusion was made to this statue while it was in the Paris *Salon* of the same year, but it was not until 1880, three years after, when it appeared again, in bronze, in company with its immediate successor "St. John," that the Paris art writers began to realize that a new and powerful personality had come into the world of French art. Scores of them, since then, have written in his praise, and many became

[1] All rights reserved. Continued from page 251, No. 700.

his valiant personal friends. Justly due, as well to the genuine character of the man as to his merits as an artist.

Among these writers are Octave Mirbeau, G. d'Argenty, Edmond Bazire, S. de Fourcaud, Roger Marx, André Michel, and Marcel Fouquier.

L'Art was the first paper to defend Rodin against the accusation in regard to "The Age of Brass," in 1877. The principal illustrated papers of Paris have published engravings of his busts of Laurens, Hugo, Dalou, and St. John, with accompanying text.

His friends and admirers among the painters number such men as Jean Paul Laurens, Puvis de Chavannes, and Claude Monet; and among the sculptors, Jean Paul Aubé, Adrien Gaudez, and many others, especially of the younger generation.

The Englishmen who have written about Rodin are W. S. Henley, Claude Phillips, R. L. Stephenson and Cosmo Monkhouse. The *Magazine of Art* has given more attention to him than any other paper, though articles have appeared in *The Portfolio, Academy, Whitehall* and *Fortnightly Reviews, The Architect, Court and Society,* and the *St. James Gazette*. Cosmo Monkhouse writes that Henley was one of the first Englishmen to recognize the true merits of Rodin, and has done more than any other writer to make them known in England.

At first, some of the English writers were disposed to be a little cold, guarded and patronizing, even advising Rodin how to do better sculpture, and accusing him of being a reminiscence of Michael Angelo. Others have been, from the first, his warm admirers. In comparing the hundreds of articles by writers of both countries, the impression is made that the Englishman is more disposed to argue, compare and reason, while the Frenchman makes it a matter of personal pleasure to enjoy the manifestations of a new, fresh and stirring element in the art of his country.

All in all, no artist of modern times has been so generally discussed by tongue and pen as Rodin, and with reason, for none have brought such an amount of disturbing and vital baggage into the warehouse of modern art.

Among English art-lovers the sculptor counts many friends, who were the first to show their appreciation by buying his works. No less than ten duplicates, in bronze, of "The Broken Nose," as well as copies of some of his more important small figures, busts and groups, are owned in England, while not one copy of his great mask has been sold in France. [The first bronze duplicate of the bust of "St. John" sold in France was bought by Mr. George A. Lucas, a well-known American art-lover who lives in that city, and this as late as 1888, ten years after it was made.] The English appreciation of Rodin is due to a large extent to Alphonse Legros, one of the strongest of French artists, who has lived in England for twenty years, and is a professor of art in the Slade School. Some time in 1880-81, a mutual friend brought Legros to Rodin's studio, and the account of what was seen there was carried across the Channel, to the great personal, professional and pecuniary advantage of the sculptor. Visiting Legros soon after, Rodin made the acquaintance of Browning, Sir Frederick Leighton, Lord Lytton and many other eminent representatives of English art and literature. They were some of the buyers of his works. Since then he makes annual visits to the city on the Thames.

PORTRAITS OF RODIN.

Rodin himself has been the submissive subject of the artist's pencil. Best, of Brussels, engraved him, Bastien-Lepage made a dry-point etching, Liphart a pen-and-ink drawing, and Harquette and Sargent painted him in oil. The latter's picture was exhibited in Petit's gallery, and made a great success. Laurens has painted Rodin twice: once for the latter, and the other for his great picture in the Panthéon, "The Death of St Geneviève."

SOME IMPRESSIONS OF RODIN'S IDEAS ON ART AND ART EDUCATION, AND ON THE CHARACTER OF HIS OWN MODELLING.

If the character of Rodin's sculpture is radically different from the majority of that produced at the present time, it is to be expected that his ideas on art and art education would also differ from those generally prevailing on those subjects. The almost-universally accepted belief, which began to spread soon after the French Revolution, and was indulged in by Canova, Thorwaldsen, and nearly all the painters and sculptors who succeeded them for a long time, David among them, that Greek sculpture is an ideal representation, and not a faithful reproduction of nature, finds in Rodin a decided opponent. He believes that Greek sculpture is the perfection of realism, nature simply and comprehensively copied by the strongest, healthiest and clearest eyes and hands; that the Greeks never conventionalized their models in the execution of their statues as most moderns do, nor slighted nor attenuated the details, but made them as large, in their scope and place, as they did the more extensive planes and masses.

He thinks that, following the teachings of the French School of Fine Arts, which are based on the Canovian idea, the pupils study nature to make it Greek, and copy the latter because they think it ideal. As a result, they make imitations of the Greek that are cold, conventional and weak, not representations of living sculpture. They, no doubt, wish to make sculpture that is large and simple in form, not by a deep study and respect of all there is in nature, but by eliminating too much that is important and characteristic. It may be what they understand as true Greek, but it is not true Greek.

Greek sculpture, Rodin asserts, is warm, strong, firm, simple, true to nature and full of power. It is life itself.

Another error of the French school which Rodin regards as objectionable is that known as working in bas-relief, or from only one side of the model, to get what is called "a fine line or profile." It is well understood that by constantly looking at a model from one side or from one point-of-view, the eyes of the pupil become so accustomed to looking in that way that he sees everything in bas-relief, and can neither see nor work in any other way. The result of this is that the pupil learns little or nothing of the full, round figure, finds it extremely difficult to make one, and still more difficult to compose two or more figures together; his work looks like a bas-relief — flat; the effect, not the fact, of a figure. Ingres is regarded as a great sinner in this respect. He made everything in bas-relief, was very fastidious about his outline, and neglected to put anything inside.

As a whole, Rodin thinks that the teaching of the School does not include a thorough comprehension of either nature or the Greek, and that its pupils are very imperfectly prepared for the execution of great works of art.

The future of French art appears to him to rest upon a return to a more faithful, serious and persevering study of nature, and he supports his opinion by referring to nature as the compendium of all the inspiration and principles of art, and to the experience and works of all the great artists of the world, as unanswerable illustrations of its truth. He says that the human form has its own peculiar atmosphere, which, if once entered into by the artist, reveals a world of charm and grandeur; that it is as endless in its variety of movement as it is unlimited in its beauty; that no imagination can begin to ask all that it can give, and that nothing is hidden by it, save from those who cannot see; that all science and all art is centred in the human form; that everything that is typical and harmonious should be faithfully copied by the artist, and, when so copied, is good and beautiful sculpture. Nature never deceives nor makes false pretensions. But it must be studied and copied with the inflexible determination of a religious devotee, even *servilely*. It must be seen with soul and eye.

Even if the Greeks were so strong that they could copy nature perfectly in all its depths and subtleties, there is no reason why, in Rodin's estimation, the principles upon which they worked should not form the basis of all art-instruction. He insists that the pupil should be taught what nature is, urged to copy it with the most scrupulous care, and to study his model in all its profiles, and then he will be able to make full, round figures, as well as bas-reliefs, one as well as the other. He refers to Delaernix as one of the first painters to get away from these false ideas of nature and the antique, and to succeed in arriving at a great and truthful power of expression. For the better understanding of true sculpture, Rude was able to do a great deal, and, though there is much that is cold and dry in the details of his great bas-relief on the Arc de Triomphe, its spirit is splendid and its planes are immense.

Carpeaux was the first sculptor of a later generation, though a graduate of the School, to emancipate himself from its teachings. He succeeded in putting life into his work, in composing several figures together, and in making fine and sculpturesque planes — so much so that minor defects are rarely noticed.

The best French sculptors agree with Rodin in regard to the imperfect teaching of the School, and are trying to escape the influence it had upon them, and some of them have succeeded.

Rodin is also of the opinion that the requirements for entering the School are not sufficiently stringent. There are those who affirm that "it is simply a mill that takes every one in and grinds them out as artists — and such artists!" They go so far in its condemnation that they are in favor of closing its doors, at least for a time, because, all in all, "it is a formidable enemy to true art progress."

The practice, in and out of the School, of working with "bullets" finds no favor with Rodin.

The sculptor, instead of putting on the clay with a sweep of his thumb or fingers, and thus indicating, with his every touch, the ever-important fact of planes, rolls it out into a little ball, and carefully places it where he desires with a slight pressure of his finger. A figure thus made looks like a mass of flattened bullets. This method of modelling is not regarded as indicating a true sensibility of form, but a way of hiding an incapacity for serious modelling. It is also affirmed that when such work is executed in marble it is lifeless, hard and without character, because it has no element in it that will produce sculpture.

The Greeks saw and felt this, and they were so strong that they could reproduce what they saw and felt, they could copy nature perfectly, they understood the human form to its very depths, and were in accord with its most intimate harmony. Nor is their art confined alone to gods, it is in everything they made, animals as well as men.

The Greeks suppressed nothing, because nothing was beneath its appropriate dignity and preservation. All there is in nature, is in their sculpture.

The imitation of nature, without feeling or comprehending this harmony and atmosphere, is not art.

And it is also true that all true criticism of art is based upon a knowledge and understanding of these truths, and not upon taste.

The affinity between the conceptive intuitions of the artist and the human form is as absolute as it is intimate, and as limitless as they are numberless.

A model may suggest, or awaken and bring to a conclusion, by a movement or position, a composition that lies dormant in the mind of the artist. And such composition may or may not represent a defined subject, yet be an agreeable and harmonious whole, suggesting to different minds as many names.

The physical and mental character of a model regulates, to a great degree, this affinity.

A model is, therefore, more than a means whereby the artist expresses a sentiment, thought, or experience, it is a correlative inspiration to him. They work together as a productive force.

Rodin speaks of Barye as the master of masters, who clung to nature with the force and tenacity of a god and dominated everything. He was beyond all and outside of all art-influences, save nature and the antique. He was one of, if not the most, isolated artists that ever lived. Emphatically original, and the first in the world in that kind of originality. He was himself and himself alone.

Figures from the Door, Auguste Rodin, Sculptor.

"One thinks of him and the Assyrians together, though it is not known that he knew anything about them. It is impossible to believe that he was affected by them, because everything that he did was Barye. He is too strong to be generally liked, even in France. Neither is he understood; he belongs to the centuries, and only after them will he be loved. He is our great glory, and we shall have to depend upon him in coming generations."

Rodin thinks that Rude should be placed next to Barye, and then Carpeaux. Puget also worked from nature and had a fine perfection of form.

The indescribable abnegation of such men as Barye, Millet, Rude, and Puget, is a consolation, as well as a sorrow to every true artist. They were heroes.

Donatello was also a student of nature, and how varied he is: more so than Ghiberti, Michael Angelo, or Signorelli.

Rodin says that the "St. George" of Donatello is all there is of Italian art, its sum and flower — an angel. The other statues on the Or' St. Michel, by this sculptor, are not so good. His equestrian statue, at Padua, is, in Rodin's estimation, the best one since the Greeks. All these leaders in Italian art were colossal, giants. Of Michael Angelo, no writer, says Rodin, has touched the hem of his garment, in the appreciation and understanding of his immense genius. He was right when he said that Ghiberti's door was fit to be the gate of Paradise.

Although the dominating tendency of Rodin's nature is Gothic, and his work would be classed in that style, more than in any other, he is, in his taste and admiration very cosmopolitan. Everything that is good sculpture, no matter what its style or date, gains his warm appreciation. If he loves the sculpture of the Parthénon the best of all, he is disposed to give to Assyrian sculpture the preference for grandeur of style and expression. Of individual specimens of Greek sculpture he prefers the Sleeping Faun, Venus of Milo, and the recently discovered Greek Victory. Then follow the Ariadne, Venus of Vienne, the bronzes in the Naples Museum, the Marsyas, Dying Gladiator, and the Idol, at Florence.

He regards the statue of Demosthenes as a fine work, but not the best Greek. For the equestrian Marcus Aurelius, "there is no name." "One of the finest things in the world is the Mercury, by Brian," at the School of Fine Arts, in Paris. "It received the Medal of Honor in 1864, and it was the most deserved one ever given in Paris. The statue, as such, is nothing; but the work on it! Such force and beauty!"

This unfinished figure of a sitting Mercury, was found in the miserable attic-studio of the sculptor the day after his death. Brian died in poverty, and tradition has clothed the event with this touching story: Fearing that his clay model would freeze during the night, he covered it with his only blanket, and thus deprived his starved body of its own protection. His frozen corpse, witnessed in the morning this final sacrifice to art.

In urging the study of nature as the only guide and inspiration for the artist, Rodin gives in words the synonym of his own life-work. Nature has revealed to him her mysteries, and those of her sculptured counterpart, the antique. He feels the winning power of the former, and the truthfulness, life, simplicity, and never-changing youth of the latter.

But it was only at the age of thirty-five, and after eighteen years of the hardest study, that he was able to fully assert his instincts and trust implicitly to the teachings of nature.

It is a singular fact that while he was all this time struggling and progressing, he was unable to see anything in Barye, and accepted the popular dictum that Pradier and Ingres were veritable gods. All of his early work, the "Broken Nose" as an example, was in the right way of modelling, and without realizing its full significance, he was studying his full figures from all profiles, and learning to make full round statues.

It is easy to understand why nothing that Rodin did, from the time the "Broken Nose" was made, and during the seven years that he was working with Bellouse, should please his acquaintances; it was not the kind of sculpture then in vogue. It had too much nature in it and not enough of false Greek.

Rodin knew very well that he was doing a tremendous amount of study, and his only comfort was in the belief that he was, at least, a realist. His work did not please him, it looked small and lifeless. He labored in faith and darkness. Neither did the sculpture produced by others at that time give him any pleasure.

Constantly hearing his things condemned, and never attaining his ambition to do strong and powerful work, he began to think that he was not in the right way. But as he saw no better he kept on, following blindly his own feelings and working harder than ever. At last, he got hold of nature, his modelling had life in it, was more supple, it had freedom, freshness, and the authority of a well-founded faith.

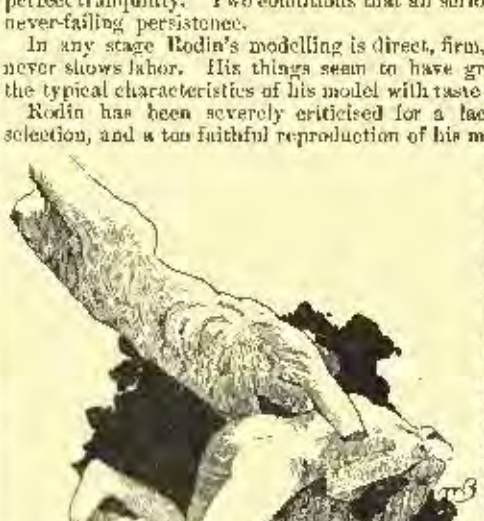
There was logic in the movement of his figures, and he expressed himself without let or hindrance. He felt that he was now a true realist. He made the "Age of Brass."

The character of the "Broken Nose," as a piece of sculpture, is a great explainer of Rodin's early life, a resumé of the superior tone, firm temper, and desperate grip that carried him to victory, in spite of all obstacles.

It is singular, that master as Rodin is of the human form, and familiar with all the inner powers that actuate it, it is almost always at the very last moment that he is able to find the exact movement or expression that he wants in a figure or bust. There is the inevitable wandering around in desolation and discouragement, in the attempt to reproduce that which nature presents to him. Sometimes he does not find his movement or expression until after the work is in plaster, and then he produces it in clay and makes the desired changes. The character of his modelling is peculiar. At first, or in its early stages, it looks like the Renaissance, but if he carries it far enough it resembles the Antique, as in the case of the torso of "St. John." Carrying it far enough implies, with Rodin, ample time and perfect tranquility. Two conditions that all serious artists seek with never-failing persistence.

In any stage Rodin's modelling is direct, firm, full, and living; it never shows labor. His things seem to have grown. He accents the typical characteristics of his model with taste and judgment.

Rodin has been severely criticised for a lack of taste in the selection, and a too faithful reproduction of his models, and for a too true representation of the divine passion of love. For "having a contempt, at one period of his career — when he made the 'St. John' — of the merely agreeable," and of choosing "To express his conceptions in forms expressive rather than in themselves beautiful, by means of gestures and attitudes passionate and significant, rather than attuned to rhythmical harmony." The "St. John" has been pronounced a low physical and mental type, too low to fitly represent the great precursor. Its back, head, and feet, have been pointed out as confirming evidence of the truthfulness of this criticism.



Figures from the Door, Auguste Rodin, Sculptor.

The "poetic realism," and "the nobility of the statue," have rarely been questioned.

To the ordinary observer it would seem that these objectionable parts help to make the statue and help to produce the impression of "nobility" and "poetic realism."

As a comparative allusion to the Renaissance leader, it was affirmed that Donatello, Rodin's "great prototype, even when he accentuated to the verge of exaggeration, and sometimes beyond that limit, the æsthetic type in similar delineations, never deprived it wholly of its nobler physical characteristics."

It has been said that no such perfect models, as those seen in the sculpture of Donatello and Michael Angelo, have ever existed, and that one of the unrivalled excellencies of these sculptors, consisted in their power to perfect, in their statues, the imperfect living model. The probabilities are that Rodin never thought or cared whether his model for the "St. John" represented the highest type, or whether the

head, back, or feet were those of a saint or sinner. The model appeared good to the sculptor, and was copied. For that time and purpose it suited the sentiment it suggested.

Rodin especially liked the peculiar type of his model, its general construction, and its back.

Both model and statue represent a rude, earnest man of the people, in movement and attitude natural, primitive and unstudied, very true and very forceful.

As models go, the one used for "The Age of Brass" would be considered an excellent specimen of a young man. Some of the female figures on the door would escape the criticisms made against the "St. John," and be regarded as beautiful enough to satisfy the most fastidious definition of that elastically-defined adjective.

The origin of the "St. John" is interesting as an illustration of the simplicity of the workings of the artist's mind on this occasion. When the model had taken off his garments, he assumed of himself a position natural to him. This position suggested to the sculptor the subject of "St. John"; he emphasized it and made the statue. The origin of "The Age of Brass," though somewhat different, was quite as simple. The sole idea in the sculptor's mind was to make a study of the nude, a good figure, correct in design, concise in style, and firm in modelling — to make a good piece of sculpture. For the sake of elucidation, the process of the origin may be sketched as follows: The necessity of artistic action moves the artist into contact with nature, its recognized inspirer, and he places his model in various positions, in keeping with its character, until he finds one that is harmonious in every way. In this instance the question of subject is not included. The position, movement, attitude of the model, as found by the artist, is satisfactory to him, and he makes the statue. After it is completed it suggests various names and subjects to those who see it, though it is really nothing more nor less than a piece of sculpture — an expression of the sculptor's sense of understanding of the character of his model, and of his capacity to reproduce it in clay.

Whatever place this process may occupy in the consideration of art-production, one thing is, at least, certain: the existence of a charming figure, from every view mysterious, and from its left side dramatic.

In the execution of these two statues, Nature was the guide of the sculptor.

If the statue of "St. John" did not have an immediate success, the model from which it was made became at once in great demand; but, not being understood and used in accordance with his physical and mental make-up, the statues that were made from him were not in the highest degree successful. He was placed in attitudes out of harmony with himself. Modern statues of "St. John" have been nearly always represented as boys or youths. Rodin makes his from a man of middle age, in order to more emphatically enforce the purpose of the subject: a personality who approaches his hearers authoritatively, and in his function their superior.

Before leaving the "St. John" and "The Age of Brass," an allusion may be made to the places they occupy as curious coincidences in connection with their history, character and sentiment. The latter stands in a retired corner of the Luxembourg Garden, in the centre of a large grass-plot, so that, obeying the accustomed warning provided for the protection of the green carpet, the curious visitor and the admiring art-lover are prevented from any near appreciation of its beauties.

The "St. John" does not stand, like a wall-flower, in solemn processional contiguity with its scores of sainted and mythological brethren and sisters, but is planted in the very middle of one of the two aisles that divide the hall of sculpture of the Luxembourg Museum.

The fault of a too free representation of the passion of love was first found at the time of the exhibition at Petit's galleries of some groups and sketches of the figures made for the door, and again referred to by some English artists who visited Rodin's studio. The pleasing terms used to designate these works were "vulgar," "indecent," "illogical," "exaggerated effects." Private criticism has denominated their author as "crazy" and a "fool."

Such tiresomely inevitable, but legitimate, condemnation seems to be the certain greeting given, by a portion of the world, to every free and rich-giving contributor of germinal productions. Fortunately, in France, there is no punishment attached to it. The sculptor may here make his representations of love's manifold expressions, the chastity of passion, and its amorous tone and glow without fear, and in undisturbed confidence that he will find his due audience, without waiting for the "sane serenities of futurity."

It is certain that the early Puritans would have burned Rodin at the stake, and not less certain that some of the later ones, if in years to come they should look upon the door, will be tempted to clothe many of its figures and groups with a more material veil than that evolved from the brain of one of the sweetest, purest and most delicate souls that ever touched clay into loveliness and grace.

With everything that is fine Rodin goes to extremes, being an excellent example of what was never said with a finer understanding than by William Blake, that "Safety is always in extremes." The faults of men like Rodin are degrees of perfection.

Rodin looks at and loves the human form in something the same way that he does trees. A crooked, gnarled or even eccentric one, if it has character, gains his regard just as much as the one that is straight and regular.

It is generally understood, and with reason, that Rodin was a pupil of Barye and Belleuse, because it is so stated in the *Salon* catalogues. The truth is that he has had no master, and owes nothing, professionally, to any one.

When Courbet sent his first picture to the *Salon*, he wrote on the card that went with it, "Pupil of Nature," but the authorities would not accept this designation, as it is an inexorable rule of that organization that the French *exposant* shall be the pupil of some master. When Rodin sent "The Age of Brass," in 1877, he was obliged to give the name of some one, so he put down those of Barye and Belleuse: of the first because he had attended the classes of that sculptor at the Jardin des Plantes, though gaining nothing thereby, and of the latter as a matter of politeness.

Like all young French sculptors, Rodin tried time and again to make something that would *sell*, in order to lighten the load he was carrying of poverty and low wages, but, to his bitter sorrow, he could not succeed. Now he thinks that he was fortunate in escaping that much-desired success, because he has observed that that kind of success is a hindrance, rather than an assistance, to the exacting and progressive necessities of true art-development, and he fears that it would have impeded his progress.

As a general rule, Rodin does not look with favor upon early art-success, because, he thinks, it is likely to hurt the young artist by over-stimulating his pride, lessening his sensibility and love for thorough work, and leading him into a superficial style of working. To him, the safest and surest way for a young artist is hard, quiet work, with no hurry to win popular favor, especially by exhibiting at the *Salon*.

T. H. BARTLETT.

[To be concluded.]

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

POINTING FOR CONCORD GRANITE.

ST. LOUIS, MO., May 20, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — What composition would you recommend for pointing a monument of Concord Granite.

Want something about the color of the stone and durable.

Portland cement is said to be inadmissable on account of its staining the stone. Yours respectfully, MONUMENT.

[WE doubt whether Portland cement, mixed with just water enough to make it as damp as fresh loam, and thoroughly compacted with a calking-iron, or the joints forcibly applied, would stain the stone, and it is by far the best material for the purpose. Cement mixed with oil, which is often used, would stain the stone and is not so good as when mixed with water. Keene's cement, Parian cement, and Scientific cement, which can be obtained of importers, are nearly white, but are not very durable when exposed in our climate. — EDS. AMERICAN ARCHITECT.]

HEMLOCK AND RATS.

NEW YORK, N. Y., May 28, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your issue of May 25, on page 242, you write about using hemlock lumber for grain-bins, as being proof against the gnawing of rats. Several years ago I had hemlock grain-bins placed in my stable, and in a short time the rats had gnawed several holes through the hemlock boards; and they have given me trouble ever since, till I have had to have recourse to tin. I would recommend every one wishing rat-proof grain-bins or other receptacles to line them with tin or galvanized-iron. Yours truly,

H. L. HARRIS, *Architect.*

PROVIDENCE, R. I., May 29, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In reply to your request for information as to whether hemlock is proof against rats, I have the following experience to offer:

Some years ago I had a cement floor laid in a building containing an incubator and a brooder. The cement did not set properly, and the rats, burrowing through it, carried off the chickens.

I had heard that hemlock would poison the thieves, and accordingly I laid a close-jointed floor of that wood over the cement. The day after, I found a hole three inches in diameter gnawed upward through the wood at one of the joints. As fast as one hole was stopped another was made. HARRY A. CHILDS.

NOTES AND CLIPPINGS

THE FORESTS OF GUATEMALA. — A consular report says the timber of Guatemala is abundant. There are forests of mahogany and pine, and a great variety of other woods capable of being used for manu-

facturing purposes. The balsam tree grows wild, mahogany exists in large quantity, and thus far cutting has been confined to the banks of streams, where by means of floods logs can be rafted to ports for shipment. The report goes on to say: Only a small quantity of this timber goes to the United States. The great difference in rules of measurement (8 per cent against about 30 per cent reduction on gross measurement) gives preference to the markets of Europe. The prices of merchantable lumber in this market are as follows: Pine at the mills is sold at 4 1-2 cents a foot; cedar, 5 1-2 cents; mahogany, 6 1-2 cents. Oak is sold by the piece, of various dimensions. It is hewed by the Indians with their machetes, and brought to market on their backs. The sizes are usually from three to five feet in length and two to four inches in thickness. There is no fixed price, but a piece of oak four feet long, two inches thick and four or five inches wide costs about 62 1-2 cents. The measurements given are Spanish, on the basis of the vara (two feet nine inches to the yard), and the price in Guatemalan currency, which is about 70 cents on the dollar in United States gold. — *Northwestern Lumberman.*

The Forests of Alaska.—It is a mistake to suppose that the whole of that territory is heavily timbered, a good deal of it being as destitute of timber as the desert of Sahara. There are nowhere any trees or vegetation, except moss, above an altitude of 3,000 feet, the tree growth above 2,500 feet being of not much account. When it is considered how much of the country consists of lofty mountains, the area of timbered land becomes, under these conditions, somewhat restricted. The above remark applies of course, only to that portion of the territory that has been explored, a comparatively small part of the whole. What of the timber or other resources there may be in sections remote from the coast no one knows. In the far North, where the country is believed to be less mountainous, there may be, and very likely are, extensive forests, as is the case on the Eastern continent. The most common tree in Alaska is the Sitka spruce; the most valuable, the yellow cedar. Both these trees grow to a large size, some of them reaching a height of 250 feet, with a diameter of six feet near the ground. Generally they are about 160 feet high and measure four feet through at the butt. The Sitka spruce makes a good coarse lumber, much like the spruce and fir of California. The yellow cedar is, however, a much more valuable tree, having a close, fine grain, and being remarkable for its strength and durability. It is also very fragrant, and taking readily a fine polish becomes a most desirable cabinet wood. Hemlock is also quite a common tree in Alaska, with willow and alder along the water-courses. The bark of the hemlock will some day become valuable for tanning purposes. In intimating that the forests of Alaska are in some sense restricted, compared with the extent of that territory, is not to say that they will ever suffer extinction. Centuries hence, when the forests farther south have all disappeared, the coming generations will be able to draw their supplies from this vast timber preserve, which, with its power of reproduction and its immunity from the ravages of fire, will prove practically inexhaustible. Owing to the moisture of the climate and the thick coat of moss that everywhere covers the ground, it is impossible for a conflagration to occur in the forests of Alaska. — *San Francisco Wood and Iron.*

The Waste in Smoke.—The weight of the smoke cloud which daily hangs over London has been estimated by Prof. Chandler Roberts, says the *Engineering Times*, to amount to about 50 tons of solid carbon and 250 tons of carbon in the form of hydro-carbon and carbonic oxide gases. Calculated from the actual result of tests made by the Smoke Abatement Committee, the value of coal wasted in smoke from domestic grates amounts, upon the annual consumption of 5,000,000 of people, to £2,250,500. The cost of cartage on this wasted coal is calculated to be £268,750, while the unnecessary passage of about 1,500,000 horses through the streets in drawing it, adds seriously to the cost of street cleaning and repairing. Then there is the cost of taking away the extra ashes, £43,000 per year. Summing it all up, the direct and indirect cost of waste coal may be set down at £2,600,000, plus the additional loss from the damage done to property caused by the smoky atmosphere, estimated by Mr. Chadwick at £2,000,000, the whole aggregating, £4,600,000.

The Recession of Niagara.—In a recent address in Washington before the United States Geological Survey, Professor Gilbert gave the following interesting information regarding the recession of the ground under Niagara Falls: The estimate is that for the past forty-four years the falls have receded at the rate of two and four-tenths feet in a year. The Horseshoe Falls are at the head of the gorge, and the American Falls at the eastern side, but the time was when both were together, before the little point called Goat Island was reached. The recession is more rapid at the centre than on the sides; as the crest of the Horseshoe Falls retreats the water tends to concentrate there, and the time will probably come when the sides of the present falls will have become dry shores. The gorge is known to be 35,000 feet long. A calculation has shown that on this basis the falls began to wear away the rock of the escarpment near Lewiston—which had not then taken out a city charter—about 7,000 years ago, plus or minus certain items which may affect the rate of recession. The limestone is not worn; it is not ground off by rocks or debris in the water which comes to the falls from the clear depths of Lake Erie. The process is brought about by the undermining of the shale, which seems to disintegrate and suddenly crumble. Frequently great masses break loose and fall over the brink, thus changing the character of the fall. A deep basin of an unknown depth has been scoured out at the foot, probably by means of ice, which comes over the falls in great quantities in the winter. — *Exchange.*

TRADE SURVEYS

The erection of defensive fortifications, and the construction of war-vessels for offensive and defensive purposes, are engaging unusual attention of the directors of the governments of Europe and America, or most of them. The details of these preparations would make interesting and suggestive reading. The occasion for such extraordinary activity may not be clear to the ordinary mind, but it is, at least, suggestive of the possibilities of serious international complications. To the outsider, the peoples and nations of the world seem to be at peace. Industry and the creation of wealth are absorbing all the energies. Wealth is more general and more easily gathered than in past times. People can move from place to place and from country to country more readily and at small cost. Individuality is asserting itself, and personal liberty is becoming a more valued prize to the great masses of the people. Governments are gradually becoming more and more the reflection of the popular wishes. Wars and armed conflicts of all kinds are becoming more dangerous to their instigators. The people are more disinclined than they ever were to increase the enormous load of indebtedness that wars create. The age of warlike conquest has passed, and that of peaceable colonization has set in. It must be evident to the most cursory observer that an equalization of population is in progress that will lessen the evils resulting in many European countries from overcrowding, and increase the aggregate wealth and productiveness of many new countries into which population is crowding for relief. Then why, it may be asked, are all the governments vieing with each other in the size of guns and the power and speed of war-vessels, great and small, and in the strength and extent of defensive fortifications? The instincts of the people are against such expenditures and against the policy their construction and maintenance contemplates, or, at least, suggests. Inconsequential South American States have within the past few months placed orders in French foundries and ship-yards for vessels and ordnance that would make it appear they feared an attack from all the outside world. Italy is having a ship-yard and a war-material establishment built by Krupp that in some respects will rival Krupp's own works. That government, it is well-known, has some of the most powerful war-vessels ever built in its service. Its engineers are to-day perfecting plans for vessels and defences that make it appear all Europe is meditating an attack on that people. The Spanish Government is about selling vast tracts of forest-land to borrow money to be expended in some such way. France is animated with a similar spirit, and her ship-yards are crowded with work for domestic and foreign use. Germany is forging war material as never before, and Great Britain proposes to expend some scores of millions on vessels, guns and defences, as though the Dorking campaign had almost set in. Belgium has a line of earth-forts costing half a million each, intended to be destructive to any hostile fleet coming within range of their guns, that are hidden from sight. Colonial dependencies throughout the world are being hedged about with all possible precautions to repel attack, and in America the same spirit is manifest. This week, Secretary of the Navy Tracy, advertises for three more cruisers, and the ship-yards on both coasts are now crowded with government work on war-vessels. Our engineers are brimful of schemes of warlike defence for the ocean fronts, the Gulf coast and the Canadian border; and when all these schemes are executed, if they ever are, fifty millions of dollars, at least, will have disappeared in that direction. These movements and measures stand out in strange contrast with the pulpit and platform declarations of a coming brotherhood of man.

Not for years have British and European workshops been as busy as at this time in making war material, and material to assist in the outflow of peoples from overcrowded centres. Possibly these preparations would have been made long ago had steel and iron been as cheap as at present. Possibly the deep popular discontent over social and economic conditions has much to do with these enormous outlays in European countries. Recent discussions on the subject of "Fortifications and Fleets," at the United Service Institution in England, throw much light upon the whole question, and show how little has yet been accomplished in the direction of actual protection against enemies. Here, in the United States, we are practically at the mercy of enemies, if the conclusions as to England's defenses are correct. The conclusion reached by English naval and military authorities is that no land defenses can avail against a hostile fleet, and that the only safety for Great Britain lies in maintaining supremacy on the seas, so that no hostile fleet can ever reach her shores. If this is a correct conclusion, where does it place the United States with its many thousand miles of practically unguarded coast. The belief is strongly entertained that the long distance from sources of hostile attack will save us, but war vessels and torpedo vessels are as efficient on one side of the Atlantic as the other. Be the occasion for extraordinary expenditure what it may be, the fact is that for years to come the nations of the world will build and build and improve and improve their ordnance and firearms until war will become too dangerous to play at. The demands created by our own Government have, within a short time, stimulated enterprise to such an extent that our shops are able to turn out material of the heaviest kind, and of the highest requirements. Whether such governmental policies are warranted by the present conditions, it is hardly worth while to consider. The facts are: we are on the eve of a great expansion in the demand for war material, and American iron and steel makers seems to fully understand it. At this time companies have plans completed to expend between three and four million dollars in plants, wherein the heaviest ordnance and material can be supplied. Already the facilities that have been established are such as to reflect the highest credit on our iron-makers. The scarcity of steel-making ores in Spain is leading to investigations as to the availability of ores in other localities. Large deposits that can be used as acceptable substitutes are to be had in Sweden and Canada, and it is believed that splendid deposits of hematite ores are to be had in other parts of the world. The basic process, by which native phosphorous ores can be utilized is being more largely used in France, Germany and Belgium. This process will probably soon be introduced into the United States when the present patents on the Bessemer process expire. The cost of iron and steel products, particularly those steel products made by the improved processes, will be considerably reduced. The reduction in cost is attended by a corresponding expansion of demand, as iron trade statistics for ten years show. Temporary depressions may restrict production, but the general tendencies are working in the direction of an annual expansion. The requirements of governments for the next few years, and the requirements of railroad-builders and bridge-builders will help to widen the markets for iron and steel throughout the world. The fears of those who apprehend that the demands for those products have reached their limits for a few years are childish. The industry is in its infancy. Builders have ordered fully 50 per cent more this year for structures than last, and railroad managers are tearing out wooden structures constantly for iron and steel work. Until all nations are at peace, and standing armies disbanded, the makers of steel need not fear any decadence in demand for war material. The outlays will necessarily increase until each nation feels itself as safe as the inhabitants of ancient walled-towns felt when their walls were completed.

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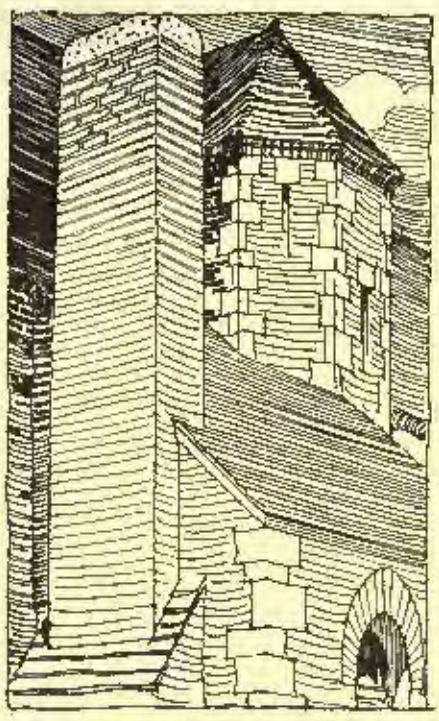

CABOT'S BRICK PRESERVATIVE

THIS IS A PECULIAR COMBINATION OF INDESTRUCTIBLE GUMS WITH AN OILY SOLVENT WHICH PREVENTS THE PENETRATION OF WATER INTO EITHER BRICKS OR MORTAR: IT GREATLY IMPROVES THE APPEARANCE OF BRICK-WORK, GIVING IT A RICH EFFECT, FREE FROM GLOSS: THE WHITE EFFLORESCENCE OF SALTS ON THE SURFACE AND THE FORMATION OF FUNGUS IS PREVENTED: AS IT IS MUCH MORE IMPERMEABLE TO WATER IT IS FAR BETTER THAN LINSEED OIL, AND IT IS NOT DESTROYED BY THE LIME OF THE MORTAR: WE CAN RECOMMEND IT FOR USE ON CHIMNEYS, AS IT WILL PREVENT THEIR DISINTEGRATION BY DRIVING RAINS. WHILE SUPERIOR TO THE BEST PAINT FOR THIS PURPOSE, IT IS ALSO MORE ECONOMICAL:

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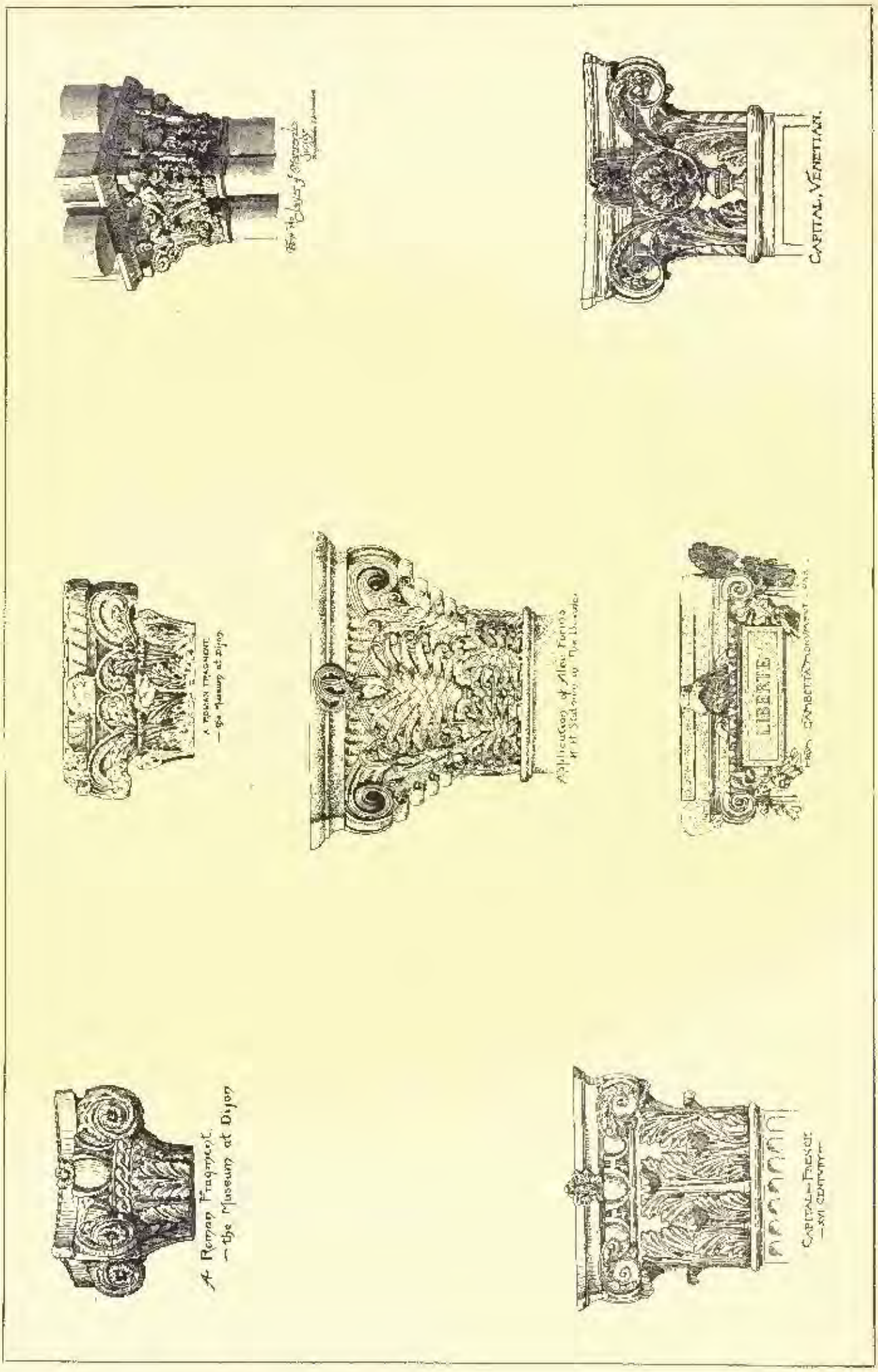
CAPITAL, VENETIAN.
A ROMAN FRAGMENT
— the Museum at Dijon
LIBERTE
A Roman Fragment.
— the Museum at Dijon
CAPITAL — FRESCO
— XVI CENTURY —

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXV. Copyright, 1889, by TICKNOR & COMPANY, Boston, Mass. No. 702.

JUNE 8, 1889.

Entered at the Post-Office at Boston as second-class matter.

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THE Trustees of Columbia College have voted to establish a Fellowship in the Department of Architecture of the College, of the value of six hundred and fifty dollars a year, but payable as a biennial gift of thirteen hundred dollars, so that the holder may be enabled to pursue post-graduate studies abroad during that period. The fellowship is founded as a compliment to Mr. F. A. Schermerhorn, to whom the University owes the Department of Architecture, which was established at his instance, and at his expense endowed with the best equipment possessed by any architectural school in the country, and maintained during its early years. The fellowship will be confined to graduates of the Department, and will be awarded after a competitive examination. This makes the third endowed course of study in Europe now open in this country to students who wish to compete for this most valuable addition to an architect's education. We do not, perhaps, realize that such advantages are not offered in any other country in the world. In France, it is true, the Prize of Rome opens to the fortunate winner a reputation and assurance of future employment which the American scholarships do not, but, in return, the American scholarships leave their possessors much freer to follow their own inclinations in the matter of study, and, being generally given to men who have had a certain amount of practical experience, instead of to students fresh from school, they encourage their holders to sketch and pick up knowledge of all sorts, in a way which would be injurious to persons just set free from their lectures and drill in classical design. It is a satisfaction to think that the more such scholarships multiply, the more it will become the habit of young architects and draughtsmen to avail themselves of the advantages that they offer, and the pleasanter it will be for the holders of the three scholarships to form a little party for travelling and sketching together. Experienced architects, who have made their dozens of trips across the ocean, do not always reflect, in their surprise at the smallness of the number of applicants for the existing scholarships, that a prize which consists in two years of exile, alone among strangers, and in countries where the architectural student must necessarily depend upon his knowledge of foreign languages to enable him to study to advantage much of the best work, presents a good many terrors, as well as attractions, to the average American youth recently from college, and an arrangement by which the three American travelling-students may have the advantage of mutual companionship, at least during the first few months of their tour, would add much to the attraction of the examinations.

A MOVEMENT has been started for a great exhibition, under the auspices of the three Americas, to be held in Washington in 1892, the four hundredth anniversary of the discovery of America by Christopher Columbus. Spain and Italy, both of which have a claim on the memory of Columbus, have, it is said, shown a disposition to take part in the celebration, while Mexico, which had at one time an idea of getting up an exhibition of its own in the same year, and in honor of the same event, will probably be glad to expend the energy which was not quite sufficient for its own show to making a creditable appearance at ours. The South American States, unless they should be occupied by that time in a general war, which is said to be possible, will undoubtedly be glad to make another demonstration of their increasing wealth and enterprise, and it is to be hoped that our own people will do their best to help the affair along. It is said that thousands of farms in the United States were mortgaged in 1876, in order that their owners might go to the Philadelphia exhibition. If that is so, it will be about time in 1892 for the children of the Centennial enthusiasts to take their turn at seeing the wonders of the world. The site proposed for the Exhibition buildings is the reclaimed ground of the Potomac Flats, close to the Washington Monument. If this is sure to be free from danger of malaria, it seems to be very suitable, and Washington itself is as pleasant and attractive a town for the purpose of celebrating a grand holiday as could be found anywhere. It does not appear just who are the leaders of the movement in this country at present, but more particulars will undoubtedly be forthcoming before long.

M. HENRI MAMY is publishing in *La Construction Moderne* some papers on theatrical scenery and effects which may be of use to architects. Some of the apparatus that he describes is new, and in regard to that which is old some useful hints are given. Most persons have seen the representation on the stage of a ship at sea. The ship in this case is placed on rollers, which run on two pieces of plank, cut out in the shape of waves. By pulling the ship with a rope, it is made to pitch and roll in a very lifelike manner. The distance is formed by a painted scene, representing a storm at sea, with black clouds, white foam, etc. The agitation of the foreground waves is still obtained by the primitive plan of covering the front of the stage with blue and green cloths, under which a lot of boys prance and run, producing a tolerably perfect illusion. M. Mamy says that the two-legged waves do not always behave as they should. Occasionally they are lazy, and the director of the theatre of the Porte St. Martin was accustomed, when he had a marine piece on the boards, to keep an eye on the waves, and, when the fury of his storm appeared to be subsiding, he would sally forth, and, with a few well-directed kicks, would reanimate the ocean to the point desired. In an English theatre once, the wave-boys, just as the ship containing the hopes of the audience was in the midst of its perilous drift across the stage, struck for higher pay. The director refused to grant it, but a look at his ship plunging and struggling in the midst of a dead calm changed his mind. He hurried back to promise the increased pay, and the sea was immediately thrown into a commotion as violent as any one could wish. Where it is desirable to change a scene with great rapidity, the two scenes which are to follow each other are sometimes painted on opposite sides of strips of zinc, which are arranged like the rolling slats of a blind. By a single movement of a wire, one scene is transformed into the other. If a costume is to be changed, instead of a whole scene, the transformation is usually effected by having the costume to be worn first put on over the other, and making the outer costume in two pieces, opening at the sides, and fastened by lacing-cords through eyelet-holes provided for the purpose. The lower ends of the cords have rings on them, and the upper ends are slightly fastened under a rosette or some other detachable ornament. If, for example, the godmother of the story has to transform herself into a fairy on the stage, her peasant costume is put on in this way over the robes of Fairyland. At the appointed time the old lady places herself just in front of a small trap in the stage, which is previously marked with chalk for her information. At a certain cue she places her hand on her shoulder, where there is a rosette, or perhaps a tuft of rags, and detaches the ends of the strings. At the same moment a hand emerges

from the little trap behind her and seizes the rings on the cords, and pulls them, when the peasant's costume disappears, to give place to the airy skirts of the fairy, while the wand, the indispensable attribute of the stage fairy, is handed to her from the same trap. One of the most effective pieces of stage machinery is that by which the heroes or heroines pass through solid walls. This is arranged by having the fictitious wall or rock, or whatever it may be, made of canvas, with light doors in it, which close with a spring. As the hero, closely pressed by his enemies, approaches the rock, he takes aim at the proper spot and darts through the spring doors, which close so quickly after him that the audience does not see how the feat is performed. A variation of this was devised for use in the "Roi Carotte." In that play one of the personages is seen on the stage, turning over the leaves of an immense book. The book is illustrated with pictures, and, as the leaves are turned, the people in the pictures jump out of the book, climb down on the stage, turn a few somersaults, and then jump back into their places on the page. This curious effect was obtained by making the middle of the pages of India-rubber, with a cut through the centre. The book lay on a table, the front of which was concealed by some other objects, while the top was perforated with a hole large enough for a man to get through, and covered by the book. A lively boy was concealed under the table, with such costumes as he needed, and at a preconcerted signal he would jump out through the India-rubber, caper a moment about the stage, and jump back again.

LA SEMAINE DES CONSTRUCTEURS makes a complaint that is frequently heard here — that it seems to be impossible to keep apartments of moderate size and rent free from vermin. As it says, in the modern, as well as the older houses, it is the rule to find bugs under the wall-papers, which are the universal decoration in Paris, most of them belonging to colonies of emigrants, which have been sent out from some slovenly household in the neighborhood, and have multiplied under the papers, in spite of all the efforts of the neater housekeepers to exterminate them. There are thousands of houses, inhabited by clean and well-bred people, where this nuisance persists, in spite of all efforts, and *La Semaine* asks if there is no remedy, short of the substitution of paint for paper, which, though effectual, does not please the taste of the Parisians. If any of our readers know of anything that can be done, many persons will be glad to hear of it. We might suggest that the paste for putting on papers in such cases should be mixed with corrosive sublimate, which would poison the bugs, besides preserving the paste from souring, and need not be dangerous to the lives of the occupants of the rooms, but a washable paint is undoubtedly much to be preferred in all such buildings.

A RATHER singular personal discussion is just now going on in Vienna, over the new Court Theatre, which is very magnificent, but which has the defect that the actors cannot be heard in it. The architect is Baron von Hasenauer, one of the most distinguished architects in Europe, and the newspapers seem to have been stimulated by his conspicuous professional position to lay a good deal of blame on him for the bad acoustic quality of the building. Naturally, Baron Hasenauer does not like this, and his friends have undertaken to defend him by explaining that the plan of the structure is not due to him, but to the late Professor Semper, who prepared before his death the scheme which was carried into execution by Hasenauer. This explanation, which has probably some reason in it, far from allaying the trouble, has, as it seems, stirred up Professor Hans Semper, the son of the great architect, who demands an opportunity to demonstrate before a jury of architects that the defects of the theatre arise from errors in design and construction which do not exist in the original plans, but were introduced by Baron Hasenauer. Which of the disputants is right it is impossible to say, and, in fact, in matters of the acoustics of buildings it is beyond the power of any person, architect or not, to make explanations that are of any value beyond the most rudimentary observations for the reason that no one knows, beyond such simple observations anything about the causes which make a building hard to hear in, or the remedy for such a state of affairs, if it exists. Meanwhile, Baron Hasenauer's friends, including Baron Hansen and many other architects of high distinction, have shown their sympathy with him by presenting him with a eulogistic address.

ON the fifth of April, the order was given for the immediate execution of the works which are to extend the sewers of Paris, so as to receive the house-wastes from the whole city, instead of from a small part, as is now the case, and convey them to the sandy peninsula of St. Germain, there to be used in fertilizing the market-gardens from which the markets of Paris are to be supplied. The land necessary for irrigation has been taken possession of, the scheme of conduits needed for bringing and applying the sewage to it has been carefully worked out, and nothing remains but to carry the plans into execution. To see that this task is properly performed, and with due regard to all public interests, a Commission has been appointed, not only to watch the construction of the system, but to observe the effects which it produces from year to year on the health of the people who live near the irrigation grounds. This Commission is to be permanent, and is to consist of five experts, one nominated by the Minister of Agriculture; one by the General Council of the Seine; one by the General Council of the Department of Seine and Oise, and a fourth by the Minister of Finance, while the fifth is chosen by the Committee of Hygiene, or, as we should call it, the National Board of Health, of France. Each of these experts represents and defends a different interest, and no measure prejudicial to the public health, or the public finances, is likely to receive the votes of a majority of the Commission. Every year the members of the Commission are required to unite in a report to the Minister of Agriculture, which is accompanied by one to the Minister of Finance.

AN artificial silk has been invented by M. Duvivier. The substance of the new fibre consists of gun-cotton, mixed with gelatine, and dissolved in strong acetic acid. This mixture is placed in a receptacle having a small orifice at the bottom, and the drop which exudes is taken up and drawn out, forming a silk-like thread. This is passed through three baths, the nature of which is not described, and is then dried. When dry it is wound on bobbins, or in skeins, which are kept in water. The color of the thread is a pale brownish yellow, and it has been successfully woven into cloth. On the whole, the new material does not seem likely to come into very fierce competition with silk. The strength of the real silk fibre is so far beyond that of any imitation yet invented that it must continue to be preferred to any artificial product, unless, possibly, some sort of glass should be devised tenacious enough to go through the ordeal of spinning and weaving.

THE *Deutsche Bauzeitung* gives some particulars in regard to the new railroad which is to cross the South American Continent, from the Atlantic Ocean at Buenos Ayres to the Pacific at Valparaiso. The greater part of the road has already been built, but the mountain section, about one hundred and fifty miles long, between Mendoza, on the side of the Argentine Republic, and Santa Rosa, on the Chili side, still remains to be completed. At Mendoza, the elevation of the present road above the sea is about twenty-five hundred feet, but in a length of one hundred and twenty-four miles the new line ascends to a height of nearly ten thousand feet. The summit is formed by a tunnel, about seven miles long, from which a descent of seven thousand feet, in a length of thirty-two miles, leads to Santa Rosa, where connection is made with the existing road to Valparaiso. It is expected that the line will be finished by the end of 1890, with the exception of the tunnel, which will take two years longer. During the construction of the tunnel, however, the road will be open for traffic, passengers and goods being transferred over the mountain pass.

AN "idea-competition" is just announced in Switzerland for a National Museum in Berne. The competition is open only to Swiss architects, who are invited to send sketches, at a scale of one to two hundred, for the elevations, as we suppose, and one to five hundred, which we imagine must be for the plans. Although the drawings will thus be very small, fourteen hundred dollars is offered in prizes, and a most imposing array of judges has been appointed, comprising Professors Auer, of Berne, and Bluntschli, of Zurich, Colonel de Saussure, of Geneva, and three well-known architects, together with Dr. von Essenwein, Director of the Germanic Museum in Nuremburg.

BUILDERS' HARDWARE.[1]—XXVII.

CLOSET-FITTINGS.

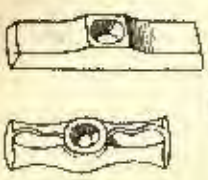


Fig. 393.

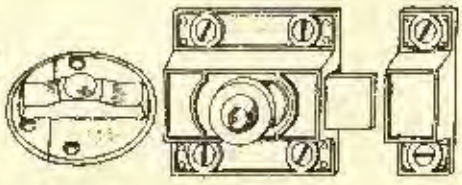


Fig. 394. Fig. 395.
Turn-buttons.

SOME of the appliances included under the title of Closet-Fittings, appertain perhaps more truly to furniture than to Builders' hardware, though they are sometimes used in connection with the finished carpenter work. The designation of closet-fittings is a somewhat arbitrary one and while not strictly applying to everything considered under this classification, might include many of the articles described in previous chapters. The limitations will, however, be sufficiently exact for the present purpose.

The simplest appliance for securing the door of a cupboard is what is known as a turn-button. Figure 393 illustrates the cheapest form, consisting of a metal bar or button which is secured in place by a screw through the centre, the screw being turned in so as to allow the button to rotate freely. An improvement is to have the button pivoted on a plate which is screwed independently to the door-frame, Figure 394, while a plate is secured to the door for the button to turn upon, or *vice versa*.

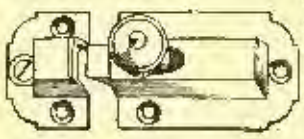


Fig. 396. Cupboard-catch.

A turn-button acts as a bolt, but it is often preferable to use some other form. Any of the flush, sunk, raised, mortise or neck bolts described in a previous chapter will answer for a cupboard, though there are a few styles which are especially designated as cupboard-bolts. Figure 395 is an example. Again, it is often desirable to have a spring-catch on a cupboard, such as that shown by Figure 396, which may be considered as a type of many different styles. Figure 397 shows a lever-cupboard catch, which works by gravity, without springs, the catch being released by raising the handle. Each of these varieties can be used for double or single doors, though with double-doors some form of bolt is necessary in addition. The book-case bolts and catches described in the chapter on bolts might properly be included, also, in the present category.

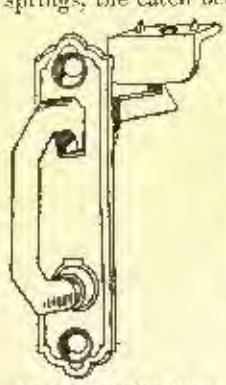


Fig. 397. Cupboard-catch.

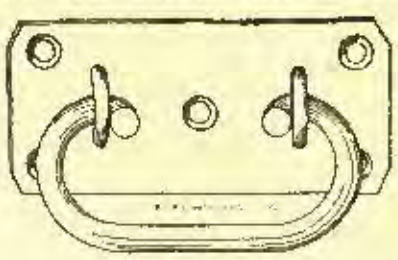


Fig. 398. Chest-hand'le.

Drawer-pulls are made in a great variety of styles, only a few of which need be considered here. Figure 398 is a cheap and very common form of wrought-iron chest or drawer handle, suitable only for rough work. Figure 399 is a very serviceable drawer-pull, and in plainer form, with sides as well as front rounded in, is what is commonly employed for china-closets, wardrobes, etc. Figures 400 and 401 are drop-handles for nice work on the same principle as the first pull illustrated. The latter is a very old pattern, such as is found on most of the antique colonial wardrobes and dressing-cases, and is just now quite in fashion. Figure 402 is a straight bar-pull and Figure 403 is a serviceable and easily attached ring drawer-pull occasionally employed for wardrobes. Figure 404 is a type of what is particularly designated as a druggist drawer-pull, being

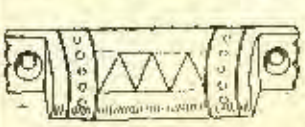


Fig. 399.

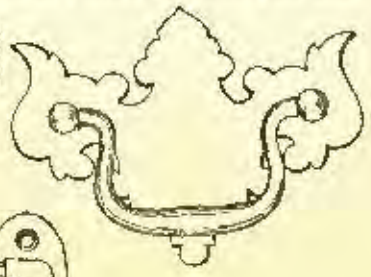


Fig. 400. Drawer-pulls. Fig. 401.

on the principle of Figure 399 but with frame and slot on the face to receive a card or label.

Drawer-knobs are mostly too simple to require any illustration. They are made with heads of wood, porcelain, mineral, composition or metal, and are usually so shaped as to dispense with a separate shank or spindle, the knob sometimes having a slight metal rose or collar. In the cheaper grades the knob has leaded into it a gimlet-pointed screw-threaded spindle which can be turned directly into the drawer-front; but a more satisfactory form has a spindle extending entirely through the drawer, and secured by a nut and washer on the inside. With a wooden knob the attachment is sometimes made by means of a screw passing through the drawer-front and turning into the knob from behind. Wood or porcelain knobs are most suitable for kitchen and china closet work, though no knob is ever as permanent or satisfactory as a drawer-pull.

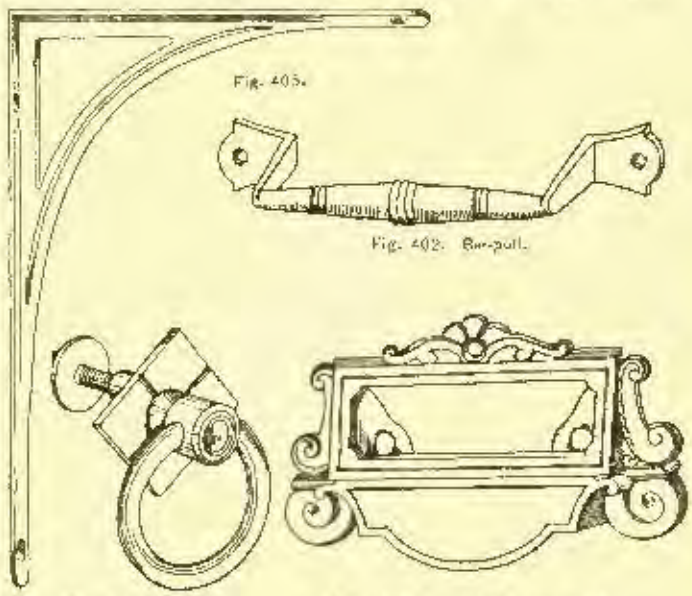


Fig. 402. Bar-pull.

Fig. 403. Ring-pull. Fig. 404. Druggists' Drawer pull.

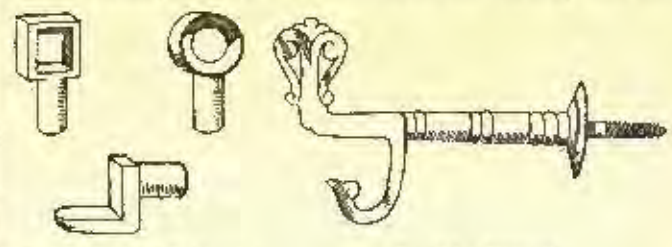


Fig. 406. Bookcase Shelf-pegs. Fig. 407. Coat-hook.

Figure 405 illustrates the ordinary shelf-brackets. They are cast in malleable-iron in sixteen or more sizes varying from 3 x 4 inches to 16 x 20 inches. The form is a very strong one, and a great deal of stiffness is obtained with a minimum of metal. They usually fail, when overloaded, by the upper arm or flange breaking near the inner screw-holes, but it requires a greater load than one would suppose to break such a bracket.

[1] Continued from No. 699, page 233.

In the chapter on knobs, the writer omitted to notice a very simple and effective form of screwless knob-fastening, recently put on the market by the Hopkins & Dickinson Manufacturing Company. In this device, the spindle, which is cut with a screw-thread, is rigidly attached to the shank and the knob on one side. The opposite shank has a swivel-connection with the knob, and is threaded inside to screw over the spindle. In application, the loose shank is screwed onto the spindle until two dogs or teeth on the inner end of the shank are engaged in slots in the rose. The rose, which projects somewhat from the face of the door and has a milled-edge, then serves as a set-screw, drawing the two shanks together and binding against a washer on the door, so that while the knobs can be rotated freely, the rose-washer and consequently the shanks, will not work loose.

There are many so-called "fancy" forms of shelf-brackets in the market few of which are in the slightest degree artistic, though most of them are stronger than the simple form shown by the figure, on account of having more metal-work between

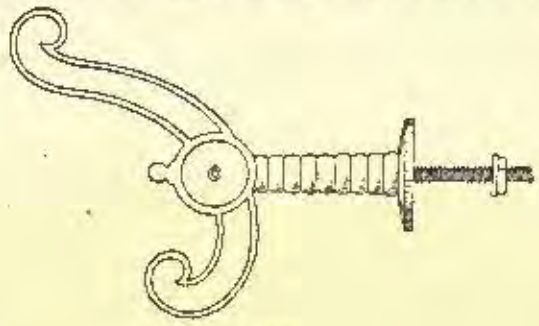


Fig. 408.

the flanges. Brass brackets are seldom required for ordinary house work and can usually be had only on a special order.

It is often desirable, in fitting up book-cases or china-closets, to have movable shelves. Shelf-pins of some sort are then

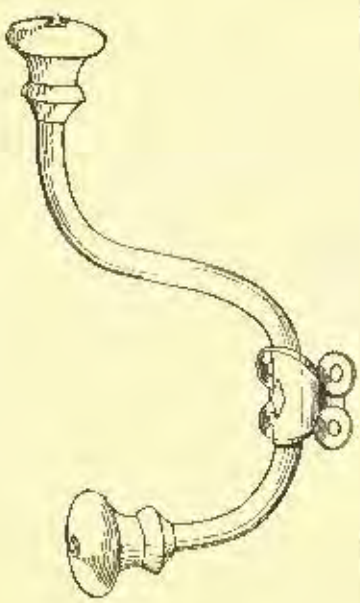


Fig. 409.

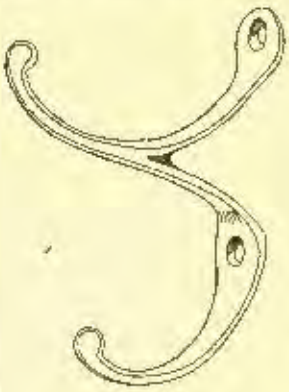


Fig. 410.

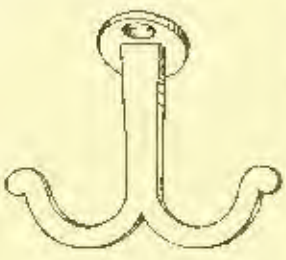


Fig. 411.

used, holes being bored at regular intervals in the sides of the case into which the pins will fit. Ordinary screw-eyes answer very well for most purposes, but are rather conspicuous when proportioned for heavy loads, and are not very easily moved.

Fig. 413.

Fig. 412.

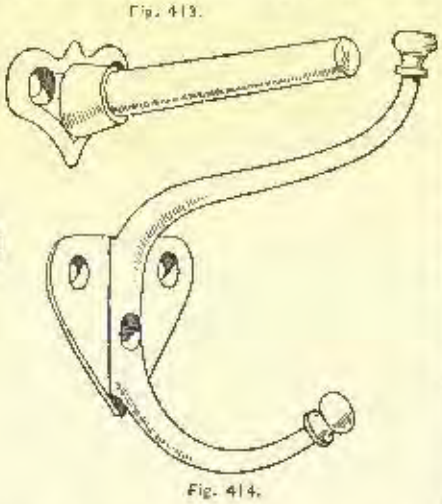


Fig. 414.

Figure 406 illustrates three patterns of specially devised shelf-pins. The ones with square and round heads are taken from the catalogue of A. G. Newman. The rebated pattern is manufactured by Russell & Irwin, and holds the shelf so that the greater portion of the pin is hidden.

Closet-hooks are made in so many different styles, and, withal, are so well-known that only a few forms need be considered, which will serve as types for three hundred or more varieties to be found in the hardware market. The hooks are invariably secured to wooden cleats which are nailed to the wall over the plaster. Figure 407 is a hat-pin with hook beneath, which can be turned directly into the wood by means of the screw-thread on the extension of the shank. Figure 408 is held by a nut turned up from behind, and can, of course, be used only on some form of hat-rack. This and the preceding are properly furniture-trimmings. Figure 409 is a familiar, old-fashioned coat-and-hat hook with porcelain knobs, a very serviceable article even though it is not quite in style. Figure 410 is a form of wardrobe hook usually made in brass or bronze, and Figure 411 is a wardrobe hook intended for dresses which are to hang from the ceiling. A similar hook, Figure 412, is fitted with a gimlet-pointed screw-shank, to screw directly into the wood. A very good wooden hook, Figure 413, is made on the same principle as a harness hook, the hardwood pin being inserted from the rear of the iron-base and bevelled, so it cannot work loose or pull out. Figures 414 and 415 are types

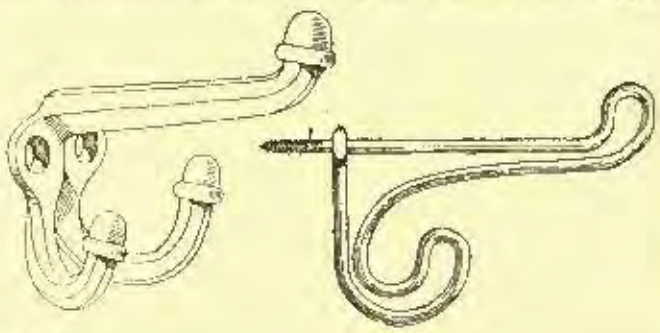


Fig. 415.

Fig. 416.

of the common hat and coat hook, the latter being specially designated as for school use. Several styles of hooks are also made of bent steel wire, Figure 416, and are very strong, light and serviceable.

All of the foregoing closet fixtures can be had in various sizes and in different materials. The following table gives some average retail prices which will serve as guides in selecting goods. The prices are for a dozen medium-sized fixtures, complete, with screws.

Table of Closet-Fixtures.

Fig.	Fixture.	Bronze.	Japanned Iron.	Bronzed Iron.	Wood.	Porcelain.
399	Turn-buttons, without plate, 1½ in.	$ .33	$ .10	$ .20	$	$
401	" " with plate, 3½ in.	.87	.63	.75	—	—
405	Cupboard-bolts,	2.25	—	.87	—	—
396	" catches	3.00	—	.55	—	—
397	Lever cupboard-catches	3.25	—	.75	—	—
398	Chest-handles, wrought	—	1.25	—	—	—
399	Drawer-pulls, plain	2.00	.25	.38	—	—
400	Lifting-handles, 3½ in. single swing	2.25	.75	1.25	—	—
401	Drop-handles	4.00	—	—	—	—
402	Bar-pulls, 4½ in.	2.00	—	.30	—	—
403	Ring-pulls	1.00	—	—	—	—
—	Druggist-pulls, plain,	4.50	—	1.50	—	—
—	Drawer-knobs, screw-end	2.50	—	—	.15	.35
—	" " bolt and nut	2.00	—	—	.30	.50
405	Shelf-brackets, 8 x 10, per doz. pairs	—	3.00	4.00	—	—
406	Shelf-pins	1.25	.06	.50	—	—
—	Ordinary coat and hat hooks	2.50	.20	.25	—	—
413	Wooden " " " "	—	—	—	.35	—
416	Wire " " " "	—	.20	.25	—	—

[To be continued.]

EQUESTRIAN MONUMENTS.[1] — XVI.

THE CONDOTTIERI. — III.

Medal by Le Pisanello in Commemoration of the Taking of Rocca Contrada.

THE successor of Carmagnola, the successful adversary of Piccinino, the contemporary of Sforza, Alfonso the Magnanimous, Federigo of Urbino and of Sigismondo Pandolfo Malatesta, Bartolomeo Colleoni, to have achieved the success and final fame that befel him, must have been — well, worthy of all the praise that has been showered upon him as a soldier and as a man.

Born of a noble family of Bergamo, Bartolomeo in his early childhood was a victim of one of the family intrigues common to those times, through which his father was slain by sundry cousins with whom he had allied himself, but who sought their own advancement by killing him and seizing his possessions. After a short stay in prison, Bartolomeo was allowed to escape and live with his mother in obscure poverty till he was of age to shift for himself. This he did by first taking service as a page in the retinue of the Lord of Piacenza; but at the age of twenty, having meanwhile taken advantage of all opportunities to attain skill and address in the use of arms, he finally took up the profession of the roving soldier, selling his service here or there where he could obtain most pay. His first real step was procuring the command of twenty men-at-arms in reward for having deserted the army of the *condottiere* Braccio to take service against him in the army of Queen Joan. When peace was finally declared he sought employment in the armies of Venice under Carmagnola in the campaign against Filippo Maria Visconti, and after Carmagnola's recall and judicial murder by the Seignory of Venice he continued in service under Gattamelata, who had succeeded to the chief command, and was waging the Republic's battle against the famous Piccinino. In these years, between 1432 and 1443, his command had been increased as he approved himself trusty and successful soldier till he was the leader of eight hundred men-at-arms, and at the death of Gattamelata in 1440 he was practically the most prominent general in Venetian employ. Further advance was, however, checked by a quarrel in 1443 with the ruling doge, and Bartolomeo, in consequence, took service with Filippo Maria Visconti, who finally, becoming jealous of the ascendancy he was obviously acquiring, threw him into prison. Filippo's death within two years caused Bartolomeo's release, and he took advantage of the temporary confusion to seize his patrimony of Bergamo in 1447. From this time to 1455 he was particularly active in changing his paymasters, twice serving the Venetians before, in 1455, he was elected commander-in-chief of the Venetian forces, with a salary of 100,000 florins. In this interval all his changes had tended to increase both his wealth and his personal importance. From this time to his death, in 1475, he held practically the most important position in all Italy, and it is conclusive evidence of the ability and unquestioned probity of the man that so jealous an employer as the great Venetian Republic should have for so long a term left in his hands the practically unqualified control of its great armies; and he himself freely expressed surprise that he was able to maintain his ascendancy, and in his declining years besought the Seignory never again to entrust so great power to a single man.

Bartolomeo Colleoni, Venice. Verrocchio and Leopardi, Sculptors. After an Etching by Unger.

More soldier than cultivated man of letters, he yet felt the movement of the times, and followed the example of others in becoming the patron of men of learning and practisers of the arts. Particularly was he fond of building, and it is less a wonder that potentates of that age, who, themselves, had no education in such matters, should have interested themselves in building than that any should have been found willing to foster the arts of painting and sculpture. In bricks and mortar the self-made leader of those days may have felt that he had to deal with substances that he knew something about, and could understand that a certain height and bigness would produce the imposing effect he aimed at, though he may have been as innocent of all appreciation of proportion as of the justness of the meter used by the poet who celebrated his success in battle. Be this as it may, it is to the whims of such men that are to be credited many of the valued architectural monuments of Italy to-day, and Colleoni, moved by whatever motive, delighted in building, and building of a useful rather than an ornamental character. A man of unusual depth of religious feeling, he felt it his duty to use his great wealth largely in the service of the Church, and accordingly built several churches and monasteries, and founded not a few endowed charitable institutions and hospitals, besides doing the duty of an enlightened ruler in providing the towns under his rule with good water, strong walls and other municipal conveniences. Naturally, Bergamo, his native town, benefited most by his care, and here he built, or rather reconstructed, the former Sacristy of S. Maria Maggiore, so that it might become the mortuary chapel of his family, and it is now known as the Capella Colleoni. It is said that in spite of his general loyalty to the Church, the Consiglio della Misericordia disliked and resisted his desire to sequestrate this portion of their belongings to serve for the aggrandizement of himself and his posterity, and that, in consequence, he had to use force to secure possession of it. Here, opposite the doorway, stands the rich and elaborate tomb of the great *condottiere*, surmounted by an equestrian statue in gilded wood, which was voted to his memory by the town of Bergamo, and was entrusted to the hands of two German sculptors, named Sisto figlio di Enrico Tigri da Norimberga and Leonardo Tedesco. The tomb itself is a costly but not very pleasing piece of work by Giovanni Antonio Omodeo, who expended 50,000 gold florins upon it.

Colleoni sought to perpetuate his name and fame not only in his native town but also in a somewhat audacious way at Venice, the scene of his latest and greatest glory. At his death in 1475, it was discovered that he had bequeathed to the Venetian Republic the greater part of his wealth — more than 100,000 ducats — on the condition that a statue should be erected in his honor on the Piazza of S. Mark where, as perhaps he knew, the law forbade that any statue should be placed. Municipal pettifogging found a way to secure the inheritance by complying with the letter of the testament, and the wily counsellors construed it that the square in front of the School of S. Mark was the place intended, and there they erected the most impressive equestrian monument that the world now contains. Burkhardt states that the Republic benefited by Colleoni's death because it confiscated his property, but this seems to be unlikely in the face of the subsequent erection of the statue, since such frugal-minded rulers would hardly have squandered a portion of their gain by devoting it to the glorification of its last possessor.

It is not possible here to examine into the discussion concerning what portions of the monument were due to Verrocchio and to Leopardi, the two sculptors whose names have gained about equal glory from being associated with the work. The commission was first entrusted to Verrocchio and he had probably carried his work on the model a long way toward completion before there came to his jealous ears a rumor that the work was to be taken from him and assigned to a pupil of Donatello's, one Vellano of Padua. Being a man at once self-respecting and quick of temper, Verrocchio forthwith smashed the clay model of the group on which he had labored so long and at once left the city. The angry city fathers passed an

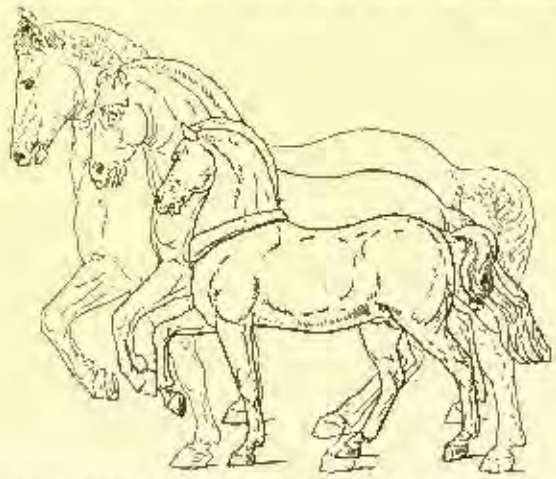
[1] Continued from No. 607, page 211.

edict of eternal banishment against him and declared his life forfeit in case he should ever again put foot on Venetian territory. Verrochio took his fate coolly and remarked to the herald who brought him the sentence of banishment, that even if the Republic did cut off his head it would not enable any one else to put a head on Colleoni's horse. This homely truth germinated slowly and bore fruit, for after the lapse of eight years the sentence of banishment was revoked and the sculptor was promised not only immunity but double pay if he would return to Venice and resume his work. Return he did and went to work, but it was too late; nature was fatigued or the current of artistic ideas was checked and before he was able to bring the group once more into shape, death put an end to his labor. Just how much he had accomplished is a matter of dispute between the learned in matters of art, and it is not desirable here to go into the discussion. It is apparently safe to assume that even if his early sketches determined the final character of the group he

Head of Bartolomeo Colleoni. From *L'Art.*

succeeded in bringing the horse only anywhere near to completion at its present size. It was Verrochio's desire, and so expressed in his will, that his pupil Lorenzo di Credi should go on with the work, but the authorities decided differently and awarded the task to Leopardi, a Venetian sculptor. The petulent temper of the Venetian rulers was continually bringing them into positions where they had to eat humble-pie or retract their own words, and in order that the work might go on it was first necessary to remit Leopardi's sentence of banishment, laid upon him because found guilty of forgery.

To Leopardi is due the figure of the rider, the pedestal, probably some of the trappings of the horse, and perhaps he it was who by some subtile changes endowed the animal with a closer approximation to animation than any other sculptor has ever achieved. The vitality of the composition, its reality so to speak, make this monument the

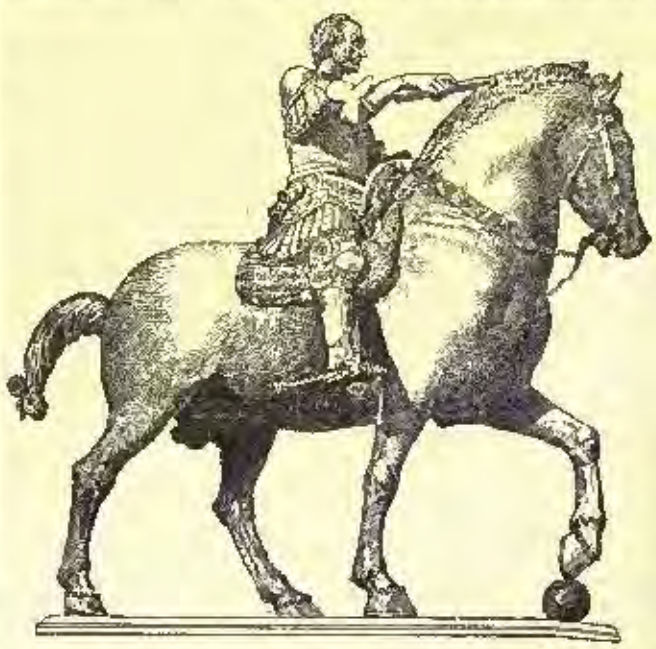


The Horses of Colleoni, Gattamelata and one of the Bronze Horses of Venice.

standard of excellence with which all equestrian sculpture — of greater age as well as of less — may be compared. It is the ideal, the almost unapproachable rendering of the truthful conception of an artistic monument. Here are a man and a horse each having the attributes that belong to the living animal, while in addition the master has endowed them with the very essence of monumentality, each having character enough to make, if separated, a remarkable piece of sculpture while, allied, the superiority to all other compositions is a fact of whose infallibility the observer is more impressed each time he brings into comparison with the group some other monument which ranks high as an artistic success. To select for favorable comparison with this masterpiece of the Renaissance period the often-derided equestrian group of Joan of Arc, by Fremiet, in the Place des Pyramides in Paris, will probably cause many to feel that praise of the modern work is an injudicious way to enforce the applause awarded to the elder monument. But as the Venetian monument reveals a real man and a real horse, so the Parisian group presents a real horse bestridden by a real woman. In both cases the sculptor's conception of his subject's character is competently rendered. The fiery impetuosity of youth merged in the sedate impassiveness of mature age is adequately declared at Venice just as the emotional impulse of inspired girlhood is shown at Paris. The remorseless doggedness of the onward movement of Colleoni's horse befits the character of his rider as the most irresisti-

Roman Cavalier by Verrochio. A Statuette in a Collection at Genoa. From *L'Art.*

ble and impressive figure of his day, just as the great Norman horse which bears the Maid of Orleans adds to her femininity the needed element of force by suggesting successful accomplishment of her purpose through the introduction of an element of weight and strength. Moreover both riders are riding as such riders should, the girl raising herself in her stirrups in her excitement and depending on them for support as a woman naturally would when she found herself for the first time seated astride, while the man rides as only the perfect horseman can ride. Nothing can surpass the magnificent action of



Gattamelata, Padua. Donatello, Sculptor.

Colleoni's body, rigid from knee to hip but above that point yielding to every motion of his steed so as to ease the animal in every possible way and prevent saddle galls. In the whole range of equestrian sculpture there are few riders who have such a seat as this, few who look as if horseback riding were an everyday affair and not a mere matter of picture-making. Usually the sculptor places a forked biped upon the back of a quadruped and makes a union between them by means of saddle and stirrup-leathers, but there are few besides Leopardi who seem to have conceived that it was possible for a man to keep his seat without the aid of the harness-maker.

WOODEN MODEL OF GATTAMELATA'S HORSE, PADUA, ITALY.

STATVE OF COLLEONI, THE SCHOOL OF ST MARK AND THE CHVRCH OF SS. GIOVANNI E PAOLO.
VENICE, ITALY.

Enterprise Publishing Co. Boston

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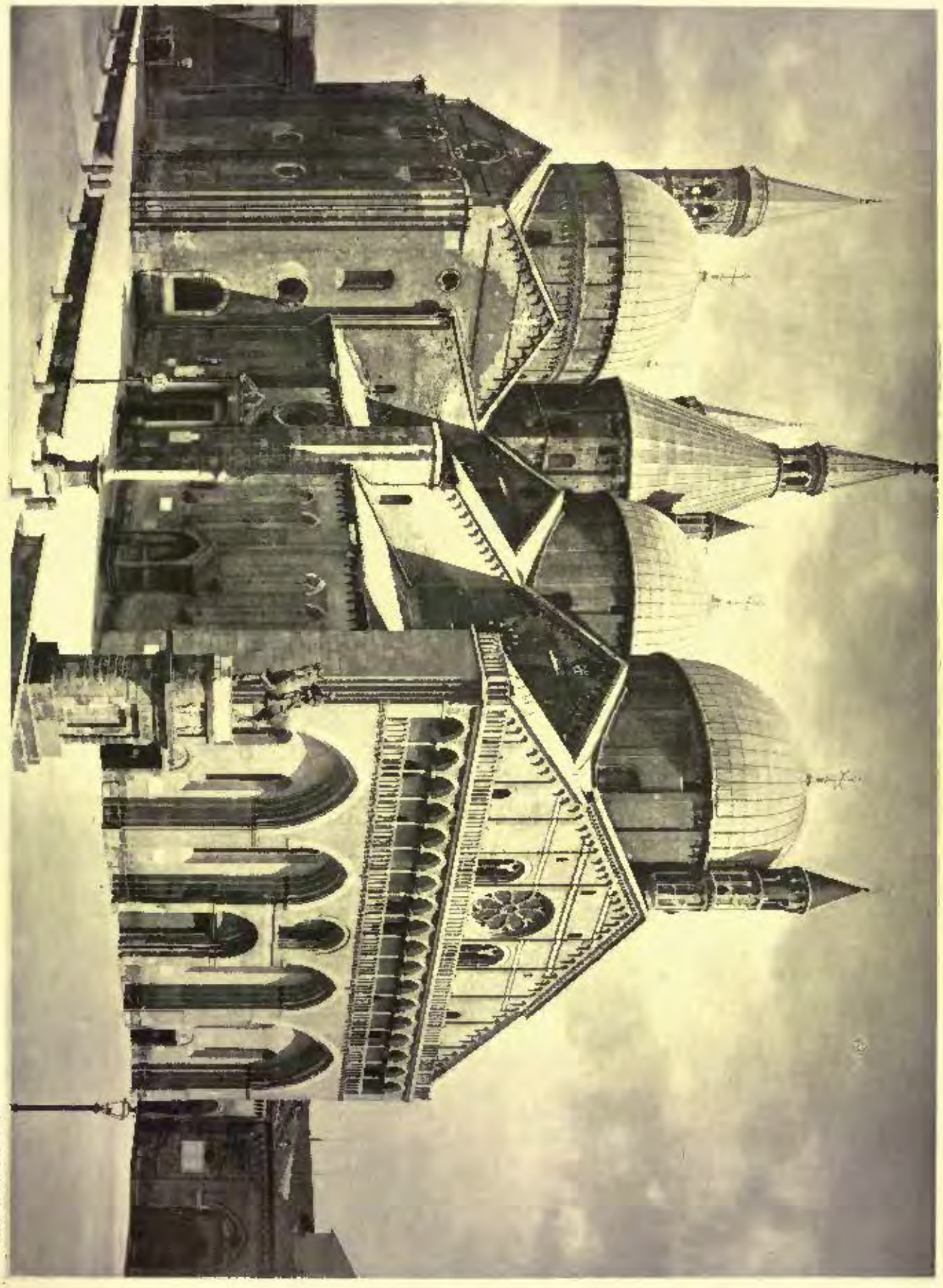

CHURCH OF SAN ANTONIO AND THE STATUE OF GATTEMELATA. PADUA, ITALY.

HELIOTYPE PRINTING CO., BOSTON.

CHURCH AND ADJOINING BUILDINGS FOR THE CORPORATION OF TRINITY CHURCH NEW YORK.

NORTH-EAST VIEW.

F. C. WITHERS
ARCHITECT

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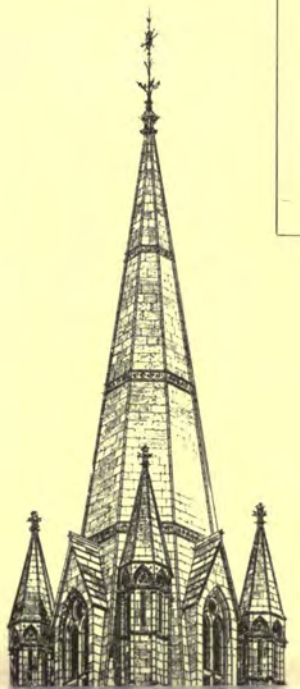
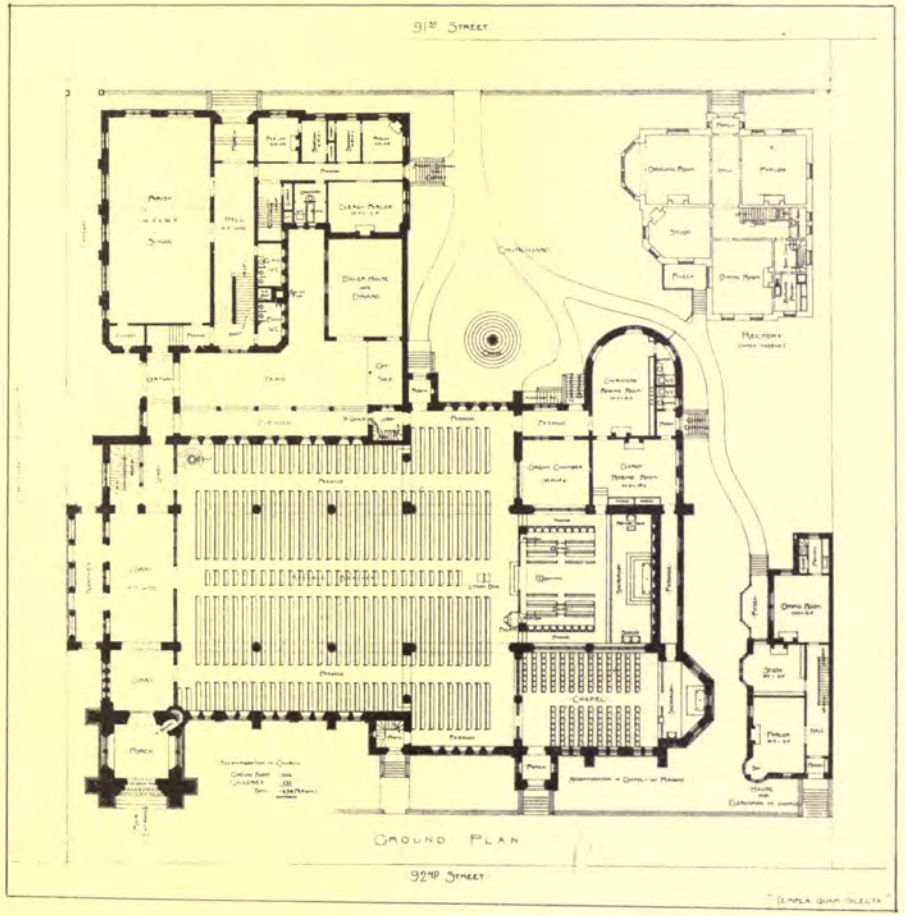
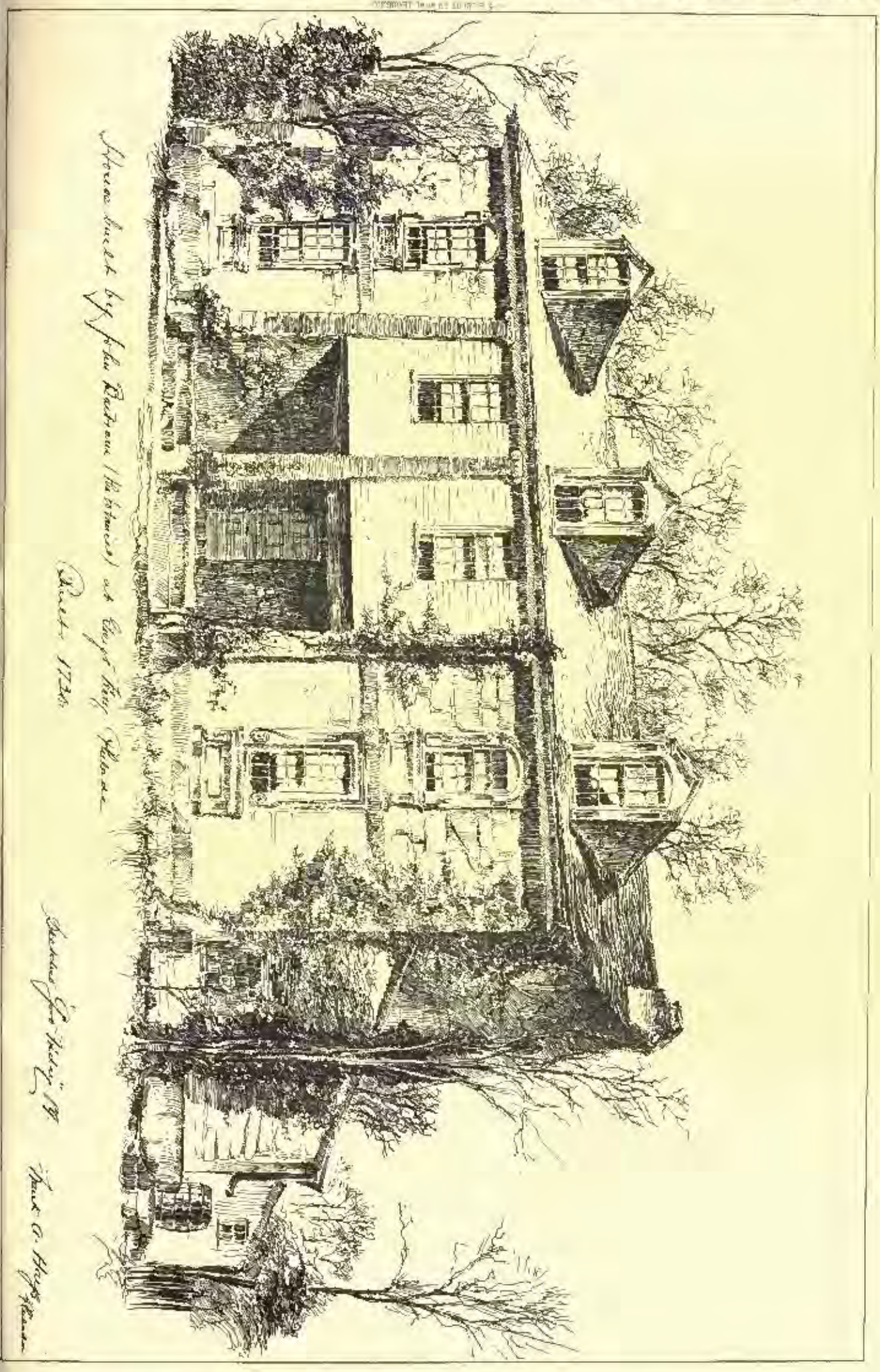
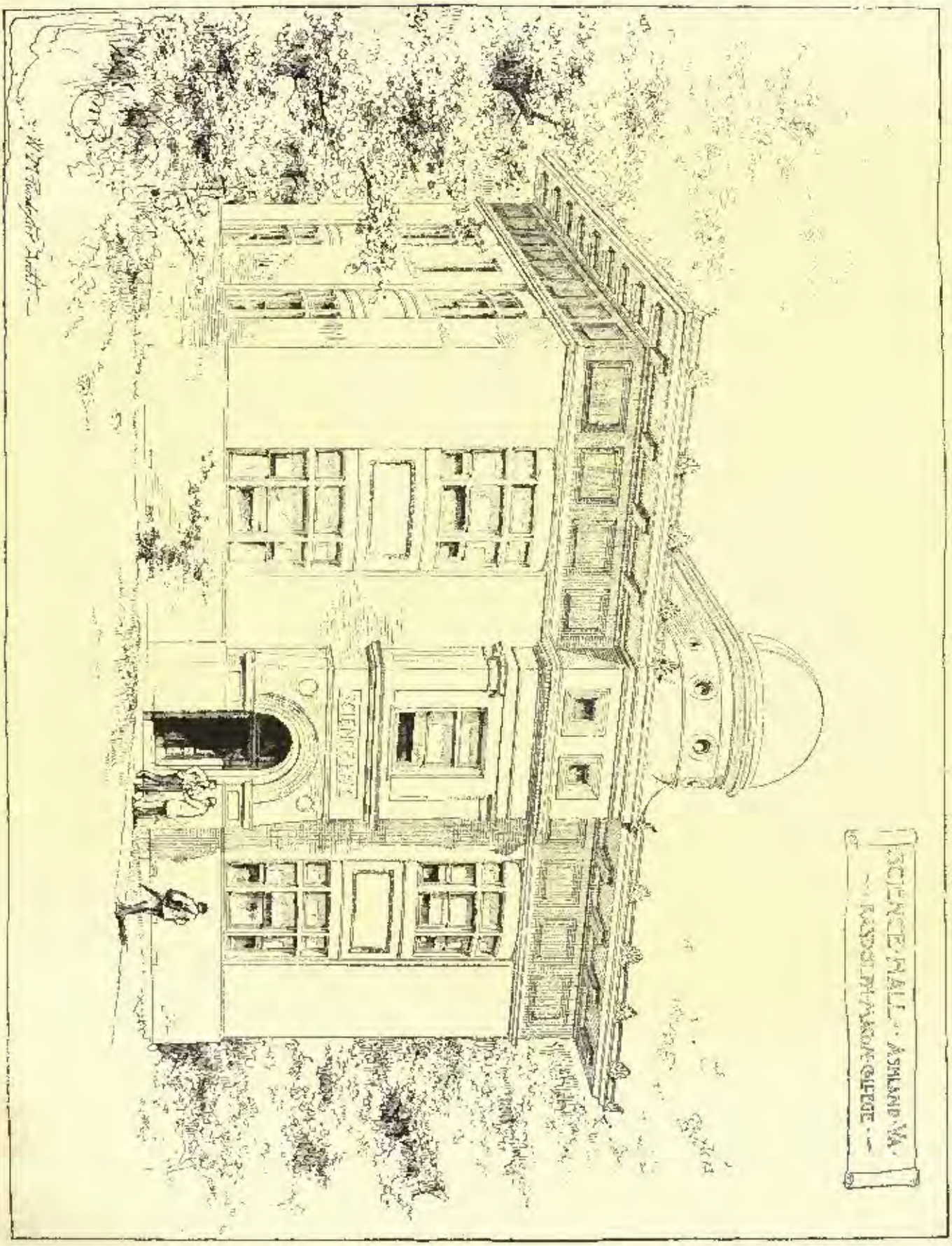






The monument was unveiled in March, 1496, and Leopardi, the survivor, was showered with applause for the manner in which the work had been finished.

Those who seek to award to Leopardi the largest share of this successful work do so by belittling Verrochio, declaring that he knew little about the making of an equestrian statue, had few models to



study, and had made no previous essays in this line of work. The existence in a private collection at Genoa of an equestrian statuette ascribed with seeming reasonableness to Verrochio may be taken as evidence that at some time in his career he had given attention to

equestrian sculpture, and the animation of this little group is not so dissimilar in kind from that which inspires the Colleoni group as to lead one to put too great faith in the assertion that it was Leopardi's genius alone that saved the monument at Venice from being merely commonplace. The statement that Verrochio was greatly indebted to his study of Donatello's equestrian statue of Gattamelata at Padua is not improbable, and there is no reason why Verrochio should not have been eagerly willing to consult the work of a master whom he must have been ready to acknowledge as his superior.

Properly speaking, the monument at Padua should be considered

among the earliest of the *condottiere* monuments, not only in point of date but because of its intrinsic merit and the renown of the artist who made it.

The son of a baker, Erasmo (or Stephano or Francesco) da Narni, nicknamed Gattamelata, achieved greatness in true *condottiere* fashion — through personal prowess and the perception of how and when to take advantage of the opportunities that the perpetual warfare of the times threw in his way. While still a young man, he was made commander-in-chief of the Venetian forces in their war with the Milanese, and in that position contended successfully with such great leaders as Ludovico Sforza and Piccinino. At his death, in 1443, his son determined to erect a statue to his memory, and assigned the task to Donatello, who seems to have preferred to devote himself to glorifying an Italian leader, rather than to perform the same service for Alphonso of Aragon, who about the same time sought to have him execute a similar monument to commemorate his capture of Naples in 1442.

The difficulties in the way of Donatello were not a few, since, first, equestrian sculpture was for him an untried field of art, and there were at that time few statues of the kind in Italy, and the means of getting at them were lacking, partly because of the imperfect means of communication, and partly because it was not possible to visit at will what might be at the time hostile territory; and, in the second place, it was an unusual thing to undertake the casting in bronze of so large a statue. What is thought to be the wooden model of one of his full-size studies for the horse is still preserved in the Palazzo della Ragione at Padua, which, at a later day, was used in some civic festivity to bear an effigy of Jupiter in procession. Not unnaturally, the horse shows traces of being inspired by the horse of Marcus Aurelius at Rome, and the bronze horses of St. Mark's. Indeed, there is a very perceptible family likeness between the horses of St. Mark's and those which bear Marcus Aurelius at Rome, Gattamelata at Padua, Colleoni at Venice, Cosmo de' Medici at Florence and Henri IV at Paris; and no less can be said of the horse, as indicated by his drawings, which Leonardo da Vinci hoped to execute for his statue of Ludovico Sforza. There is a sedate propriety of air about all these beasts, as if they felt that not only they must represent worthily the character of the steeds habitually used by their masters in daily life, but that also their deportment must lend an added dignity to a memorial that was erected not for a day, but for all time. Place one of these sturdy, if slightly heavy, horses by the side of some of the light-limbed, capering chargers or circus trick-horses which are modelled for the statues of the present day, and one receives a useful object-lesson in the value of mere static force as an element in producing a satisfactory result — an element as useful to observe in sculpture as in architecture. In short, it is the *monumental*, not the merely pictorial, statues that best stand the test of time.

Sepulchral Monument of Colleoni, Bergamo. From the *Art Journal*.

Donatello was employed about nine years in the execution of this monument — think of it, you American makers of soldiers' monuments! — and the monument was finished in 1453.

Donatello.—Donato di Niccolo di Betto Bardi, called Donatello, was born in Florence in 1386. His most noted works are a statue of David in the Bargello; one of St. Mark and one of St. George, both on the exterior of Or San Michele; a monument to Pope John XXIII in the Baptistery at Florence; the reliefs of dancing children, in the Uffizi; the external pulpit of the cathedral at Prato; and the group of Judith and Holofernes in the Loggia de' Lanzi at Florence. He was much honored and assisted by Cosimo and Piero de' Medici. He died in 1468 and was buried in the Church of San Lorenzo, at Florence.

Verrocchio.—Andrea Cione di Michele, called Verrocchio. Born in Florence, 1432. Apprenticed to Giuliano Verrocchio, a goldsmith, from whom he took the name of Verrocchio, which he has been generally said to have acquired on account of his wonderful correctness of eye. Teacher of Leonardo da Vinci. Died in Venice, 1488. Principal works — Incredulity of St. Thomas; David; Boy and Dolphin; Monument to Piero and Giovanni de' Medici and Tomb of Salvaggia Tornabuoni.

(To be continued.)

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE CATHEDRAL AND THE STATUE OF GATTAMELATA, PADUA, ITALY.

[Octavo Print, issued only with the Imperial Edition.]

"The church of San Antonio is understood to be the work of Nicolo Pisano, designed in 1237, begun in 1259 and finished in the main in 1307 though parts were not built till 1475. A conflagration caused its very complete restoration in 1749. The building measures 280 feet in length, 138 feet across the transepts and is 116 feet high. "St. Antonio has no less than eight cupolas, which, together with the two lofty octagonal bell-turrets, give the building a thoroughly Eastern appearance. As seen from the northeast, the grouping of the domes and turrets is very picturesque, its great size and variety of outline giving it a peculiar and novel grandeur; pointed and round arches are used boldly together, the walls are everywhere panelled, and there are great varieties of brick corbel courses. The detail on the whole of this striking building is meagre and disappointing, the color of the red brick is too light, and stone is but sparely used. The church was completed in 1307, with the exception of the cupola over the choir, which was not added till 1424."

COMPETITIVE DESIGN FOR CHURCH, CLERGY-HOUSE AND SCHOOLS FOR TRINITY CORPORATION, NEW YORK, N. Y. MR. F. C. WITHERS, ARCHITECT, NEW YORK, N. Y.

In order that the main entrance should be as near as possible to the Ninety-third Street station of the Elevated Railroad, a tower, 20 feet square, has been placed at the northeast corner of the lot, to serve as a porch. This porch leads directly into a large lobby, capable of accommodating 150 people. From this lobby the main body of the church is reached by three doorways, one facing the centre of the nave, and the others the passages in the aisles. Seats, all of which face the altar, are provided on this floor for 1,206 people, including the movable benches in the centre passage, which is 11 feet wide. Galleries, which are arranged in the nave over the lobby and in each of the transepts, will accommodate a total of 252 persons. The galleries in the transepts are set back so as not to interfere with the view through the arches at the end of the aisles. Each of the galleries has its separate staircase. In the chancel are stalls for 62 choristers and clergy, and, as its width is great (38 feet), a passage is made behind the stalls on either side of the exit of communicants through an opening on each side of the chancel-arch.

Ample exits from the church are provided, there being, besides those into the lobby, a porch in each of the transepts, a separate entrance for the choristers on the south side, near to the robing-room, and the clergy would have a separate entrance on the west, for the convenience of the clergyman in charge.

The "Chapel for Daily Prayer" runs parallel to, and is of the same length as the chancel, and has a separate entrance to it from a porch on Ninety-second Street. It will accommodate 161 worshippers, and can be thrown open and made a part of the church in case of great crowds.

A detached house, containing about 1,400 square feet, is provided for the clergyman in charge, on the northwest corner of the lot. This location is the most desirable, as being near the chancel, and more private than if connected with the other buildings, with the advantage also of having three sides open to the light and air. The house for the rector (when needed) containing about 2,000 square feet on a floor, is located on the southwest corner.

The building for the Sunday-school, etc., containing over 4,000 square feet, adjoins the church on the southeast corner of the lot, having its principal entrance on Ninety-first Street. The plan provides a large room, 60 feet by 30 feet, on the ground-floor for the parish school. A room for the Sunday-school, 67 feet 6 inches by 30 feet 0 inches, with a smaller one (25 feet by 18 feet) adjoining it for the infant-class, is arranged on the second floor, having direct communication with the gallery over the lobby in nave. The principal staircase would lead direct to a large hall in the third story, of the same size as the room below it.

Well-lighted rooms for class-rooms, or for the guilds and societies can be arranged in the basement of this building, with an outer entrance on Ninety-first Street, and a staircase to the ground-floor above.

On the west side of this building a private entrance from the

churchyard leads to the rooms provided for the junior clergy, viz., three sitting-rooms with bed-rooms attached, a general parlor on the first floor and a dining-room on the second floor, with pantries, bath-room, etc. The sexton's rooms will be found on the third floor, with a lift from the basement for hoisting supplies, and another to the butler's pantry on the floor below. Doorways are provided for direct communication with the main hallways of school, hall, etc., on each floor.

The walls of the church, etc., are designed to be built of rock-faced ashlar laid in random courses, Schenectady or North River bluestone being recommended for this purpose, with dressings of either Belleville, N. J., sandstone, or Indiana limestone.

The church floor would rest on iron beams with fireproof arches. Hollow tile would be used for furring and partitions, and the staircases of school building would be fireproof, enclosed with brick walls.

The church and adjoining buildings would be lighted by electricity, and warmed by steam generated in a separate boiler-house, which is located in a central position, with access to it from the street by a cartway, and so placed in an enclosed yard as to be hidden from view.

There would be a basement under the whole of the church, and, if desired, the western end, which is the highest out of the ground, can be finished off for guild rooms or other purposes, access to which would be by a staircase from the cloister, as well as from the church yard.

The style of the church is that known as Gothic of the "Early English" period.

It is estimated that the church, chapel, and adjoining buildings, can be well and substantially built for $325,000.

A ground plan of the rectory is given, but the building is not included in the above estimate.

MONUMENT TO BARTOLOMEO COLLEONI. VERROCHIO AND LEOPARDI, SCULPTORS. THE SCHOOL OF ST. MARK AND THE CHURCH OF SS. GIOVANNI E PAOLO. VENICE, ITALY.

SEE article on "Equestrian Monuments," elsewhere in this issue. A larger illustration of the equestrian portion of this monument may be found in the *American Architect* for April 25, 1885.

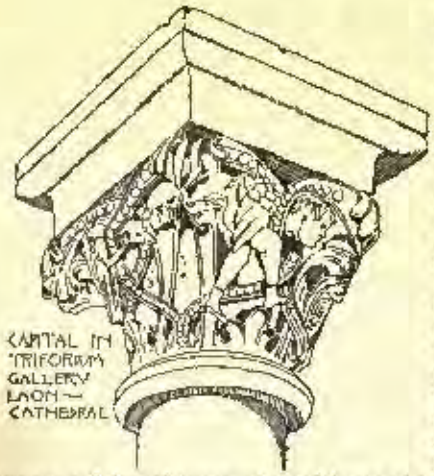
WOODEN MODEL OF HORSE FOR GATTAMELATA'S MONUMENT AT PADUA. DONATELLO, SCULPTOR.

SEE article on "Equestrian Monuments," elsewhere in this issue.

HOUSE BUILT BY JOHN BARTRAM IN 1730 AT GREY'S FERRY, PHILADELPHIA, PA. SKETCHED BY MR. FRANK HAYS, PHILADELPHIA, PA.

SCIENCE HALL, RANDOLPH MACON COLLEGE, ASHLAND, VA. MR. W. M. POINDEXTER, WASHINGTON, D. C., ARCHITECT.

THE NICARAGUA CANAL ROUTE.



ON the 30th of November, 1887, an expedition sailed from New York aboard the steamship "*Honda*" to survey and locate the route of an interoceanic canal across the territory of the Republic of Nicaragua. The party included a correspondent of *The Times*, through whom our readers were informed, from time to time, of the welfare and progress of the expedition until the completion of the main features of the survey, in July, 1888. Most of the surveyors and draughtsmen returned home about that time, but several of the party remained in Nicaragua, and have since been employed in perfecting details and making more elaborate surveys and investigations with reference to certain important parts of the contemplated work.

In the meantime a charter has been granted by the United States Government to the Maritime Canal Company of Nicaragua, certain important diplomatic questions have been satisfactorily arranged, the work of the survey expedition has been elaborated, and preparations are now completed for dispatching men and materials to reinforce the party who have remained in the field, and for beginning the construction of the canal which, it is hoped, will in a few years connect the Atlantic Ocean with the Pacific, and revolutionize the trade routes of the world.

The central portion of Nicaragua, from north to south, is occupied by the main Cordillera of the Isthmus, which is here greatly reduced in altitude, and consists merely of a confused mass of peaks and ridges of an average elevation of about one thousand feet. Between this mountainous region and the shore of the Caribbean Sea stretches a low, level country, covered with a dense forest. West of the mountain zone is a broad valley, about one hundred and twenty-five feet above the level of the sea, extending from the Gulf of Fonseca southeasterly to the boundary of Costa Rica. The greater part of this valley is occupied by the two lakes, Managua and Nicaragua, the latter 110 miles long and from 50 to 60 wide — an inland sea twice as large as Long Island Sound. Between these lakes and the Pacific Ocean is a narrow strip of land, varying from twelve to thirty miles in width. The drainage of the lakes and the entire valley around them passes through the San Juan River, and discharges into the Caribbean Sea at Greytown.

The lowest pass across the backbone of the New World from Behring Straits to the Straits of Magellan is up the valley of the San Juan and across the Lajas-Rio Grande "divide," between Lake Nicaragua and the Pacific.

The eastern section of the proposed canal, from Greytown to the first lock, a distance of ten miles, is entirely in sand and soft clay, and the surface elevation varies from three to twenty feet above the sea-level. In this section the line of the canal cuts the small streams San Juanillo and Deseado each twice, and these streams and the shallow lagoon Benard are to be diverted into new channels, easily dredged through the alluvial soil. The forest growth along this section, especially in the six or seven miles nearest the sea, is dense, but of the kind peculiar to low, swampy regions, consisting of low palms, with small roots penetrating the ground loosely and slightly. The borings do not show any sunken logs or tree-trunks buried in the alluvial deposits.

The first lock has a lift of 31 feet, and from it to the second lock, 7,620 feet, the cutting is still in clay and sand. The average elevation of the surface is about the level of the water in the canal; in some places it is lower, and some lateral embankments will be necessary. The prism of the canal in these two sections is 120 feet on the bottom, 30 feet depth, 210 feet surface width, side slopes, 1½ to 1, and area of water prism, 4,950 square feet. Lock 2 is founded upon and partially excavated in bed-rock. Its lift is 30 feet.

From this to the summit lock, a distance of 2,570 feet, the excavation will be entirely in clay and sand. A small amount of lateral embankment will be required. Lock 3 will be almost wholly excavated in the bed-rock near the end of the mountain spur which forms the eastern boundary of the creek Josephina, a considerable tributary of the Deseado from the north. From the point of this spur south of the lock a dam 77 feet high and 820 feet long on the crest, thrown across the Valley of the Deseado to a high hill on the south side, will impound and raise the water in the upper valley of the Deseado to an elevation of 106 feet above sea-level. The basin thus formed is about four miles long, nearly straight, 2,000 feet wide and 80 feet deep. The water-shed draining into it will be about 15 square miles.

At the western extremity of the Deseado Basin begins the "Deseado-San Francisco divide cut," 18,300 feet long, and of 147 feet average, and 333 maximum, depth. The material is almost entirely homogeneous trap-rock, covered to an average depth of 24 feet with clay soil. The canal prism is 80 feet on the surface, 80 feet on the bottom and 30 feet deep, and the sectional area, 2,400 square feet. The side slopes are in rock, ½ to 1, and in earth, 1½ to 1.

From the western end of this cut to the mouth of the Caño Machado, which enters the San Juan three-and-one-half miles below the mouth of the San Carlos, is twelve-and-one-half miles along the located line of the canal. This portion of the canal is made up of a series of short cuts or sections, from 150 to 1,400 feet in length, alternating with basins formed by impounding the drainage of the San Francisco Valley by a series of embankments south of the canal line. The total length of the several cuts is 2.47 miles. The total length, on the crest, of embankments, walls and dams necessary to impound the drainage of the 65 square miles of watershed of the San Francisco Valley, and hold it up to the level of 106 feet above the sea, is 33,320 feet, sub-divided as follows: Masonry walls, 6,735 feet; embankments on firm ground, varying from 54 feet in height, 12,395 feet; embankments across swamps, varying from 50 to 67 feet in height, 14,190 feet. The prism of the canal through the cuts is 80 feet on the bottom, 184 feet on the surface, and 30 feet deep, with a sectional area of 3,673 square feet. The material to be excavated is almost entirely red clay, with a very small amount of rock.

Just below the mouth of the Caño Machana, between the two steep, rocky hills, is the Ochoa Dam, across the San Juan River. The width of the river at this point is 1,133 feet, and its average depth at low stage is 6.6 feet. The dam will be 1,255 feet on the crest and 52 feet high. It will back up the water of the San Juan to Lake Nicaragua, a distance of 64 miles, and maintain the surface of the lake at an elevation of 110 feet above the sea. The upper San Juan will thus be converted into a lagoon-like extension of the lake. The width of the upper river at present varies from 420 to 1,300 feet, and its navigation at low stage is interrupted by five rapids. Raising the water by means of the dam will largely increase the river's width, and give a clear width of 30 feet over all the rapids except the upper, or Toro Rapids. Between these and the lake a

small amount of dredging and some submarine rock excavation will be necessary to obtain a thirty-foot channel.

From Fort San Carlos, at the head of the river, across the lake to the west side is 56½ miles, and for a distance of 13.7 miles out into the lake it will be necessary to dredge in soft mud, at some points 17 feet, to obtain a thirty-foot channel. The remainder of the lake is as free as the open sea. On the west side, the excavation will begin 1,400 feet from the shore, from which the canal will extend in a straight line up the valley of the Lajas and Guacoyol 5.7 miles. It will then curve across the flat divide, the crown of which is 41½ feet above the level of the lake, and 25,600 feet from the lake. From the divide the canal will pass down the valley of the brook Chocolata, and 8,600 feet west of the divide will enter the gorge of the Rio Grande, through which it will continue 18,300 feet to the eastern end of the Tola Basin, a total distance of nine miles. The prisms of the canal for this distance are: For 8,200 feet from the lake surface — width, 210 feet; bottom width, 120 feet; depth, 30 feet; area of water prisms, 4,950 square feet; for 26,000 feet through the divide, 80 feet width of surface, 80 feet bottom, 30 feet depth; area of water prism, 2,400 square feet; through the gorge of the Rio Grande — surface width, 184 feet; bottom, 80 feet; depth, 30 feet; area of water prism, 367,380 feet. The slope of the surface is gradual and regular. The bulk of the material is to be excavated in rock, which, throughout, is overlaid to a depth of 14 feet by varying strata of hard-pan, white and blue clay, and sand and black loam.

From the western end of the gorge of the Rio Grande to the head-gate of Lock No. 4, a distance of 29,000 feet, the line of the canal passes over the flat, gradually-inclined floor of the valley of the Rio Grande and the Rio Tola. A dam 2,020 feet long and 74 feet high across the gap through which the streams of this valley flow to the Pacific will impound the drainage of 83 square miles of country, and form a lake with a superficial area of a little more than six square miles, and a depth varying from 30 to 70 feet. The surface of this lake will be 110 feet above sea-level, the same level as the great lake itself. On the west side of the basin, and north of the dam, there will be a double lock with a combined lift of 85 feet, entirely excavated in the rock of the hills, and forming the northern abutment of the dam. The line of the canal through and from the double lock to the Pacific is straight.

Lock No. 6 is 8,355 feet from the tail gate of the double lock, the third and lowest lock of the Pacific flight, with a lift varying from 21 to 29 feet. The prism of the canal throughout this distance is 184 feet on the surface, 80 feet on the bottom, 30 feet deep, and area of water prism 3,673 square feet. Lock No. 6 drops the canal to the level of the Pacific, and from here to the Pacific high-water line, 6,000 feet, the material to be excavated consists entirely of recent alluvial and littoral deposits, sand, gravel, shells and mud.

To sum up: The total distance from the Atlantic to the Pacific by the Nicaragua route is, in round numbers, 170 miles, divided as follows:

	Miles.
Lake navigation	56½
River navigation	64
Basin navigation	20½
Actual canal only	29
Total	170

The summit level is 154 miles long.

It is estimated that thirty-two vessels can pass through any lock of the canal in one day. This allows forty-five minutes for each lockage. The estimated net tonnage per vessel is 1,750 tons, which are the figures for Suez in 1883. This gives a total annual tonnage of 20,000,000. It is believed, however, that the locks will be equal to forty-eight lockages a day for vessels of at least 2,000 tons. This would give an annual tonnage of 35,000,000.

The estimated cost of the canal is, in round numbers, $60,000,000, including a contingent sum of 25 per cent. These estimates include the electric-lighting of the canal, the lighting and buoying of the lake and the harbors, and railroads and telegraphs from the lake to the Pacific and from Greytown to the dam.

It is estimated by conservative authorities on the subject that the business of the canal will amount to from 5,000,000 to 6,000,000 tons in sight on the day it is opened. — *New York Times.*

BOOKS AND PAPERS.

IN looking over the first six numbers of this work,[1] I am inclined to question the correctness of the title. There is nothing of the real Japanese about it except the original motives or sketches. All else is French and German, and the illustrations, as they appear in the text and in the full-page illustrations, are French process-work — called engravings, — simply etched relief-plates, with some modifications in the more important examples.

The chief charm about Japanese art is the unaffected directness and frank simplicity in the way of handling of all the black-and-white work, and much of the reeds and grasses, flowers, etc.

There is a little stork on page 10, No. 2, that is made with three strokes of the brush, that gives one a vivid impression of the bird; and on one of the full-page plates in No. 3 we have three frogs made of metal, with jointed legs, like any other manikins, that are no end funny; but is this high art?

Running through the six numbers, we find little else than rough sketches — reproductions, mind, not the original "engravings" — in the text.

We are unable to see why the majority of these should be reproduced and placed before the Western mind with a distinct "stand and deliver" challenge for its admiration.

No one questions the superb work in bronze and *cloisonné*, which have been the charm of all fine collections of bric-à-brac, and which have brought liberal, not to say fancy, prices.

And, in a work of this high-sounding title, may we not look for a sample of fine arrangement in the construction of the pages?

There is hardly a page in the six numbers we have where the text illustrations do not run way over the type limit, and in many cases so far that, in binding, much of the intention of the artist must be entirely lost. A little bit of eccentricity in this way may have the virtue of novelty; but, if it is to be the rule, why not carry it to the types — say have twenty lines on one page and three lines on another? Surely that would give additional variety. And, except as sketches, is the bulk of the work worthy of serious consideration for the average mind of a high-grade European or American painter.

The colored landscapes have no value. They are little better than what one sees on the five-cent fans which are hawked about the streets when the thermometer is in the nineties. The masks and vases are hardly to be classed among the higher examples of Japanese art. In the collection of Professor Morse we see hundreds of forms that are not only finer, but more typical of "Artistic Japan."

The reeds and flowers are most unquestionably fine — as sketches or decorations, as you will — but we will venture to say that Hamilton Gibson and Harry Fenn have done equally clever work, and certainly truer to nature. This is written in no carping spirit. The comparison may be made by any one who is familiar with the work of these two artists.

In the plates of pure decorative work the Japanese show at their best. Some of the finer bits of close ornamental work might have been done in the American Bank-Note Company's establishment on the geometric lathe; but in the larger, broader examples we have what we have been taught to admire, and our admiration is given most ungrudgingly.

Quaint fancy, delicate invention, curious conceits, run through all; but is this the kind of art before which we must bow the knee? It is most unquestionably clever; but does it fit our needs, may we say our civilization? The brocades and stuffs open up another field. Here we have quiet, harmonious tones that are a charm to the eye, such as the taste of other nations rarely gives us. I fancy it was from such fabrics that the Kensington Art School got its color schemes. They are restful and charming to the last degree.

Some examples of these magnificent weavings may be seen in the Boston Art Museum; but do not some of the embroideries in the same collection, handsome as is the work, "yell" like a newly-gilded sign? Next to frankness and intention, should not all great art have that fine quality, repose? The "Dark Secret" is good for once in a while, as is the circus; but can we live with it?

I am aware of the fact that many artists of rank have been smitten with the Oriental craze, but I do not remember any instance in which their work was seriously influenced by it.

I find in the Japanese colored work nothing but false perspective, bad drawing and flat tints. I speak now only of the landscape and figure work. I see nothing of what is known to us as tone and quality.

The best of the European and American artists have little to learn from our almond-eyed friends in the matter of correct drawing, composition or color, but in metal-working we must take the back-seat.

Their inlaying and carving is superb. Skill and patience they have to a degree that is not possible in the busy whirl of our Western climate.

One word about the covers of the several numbers. Each differs from the other, and each is striking and taking to the eye.

The color-printing on the covers, and through the several numbers on the various full-page plates, leaves nothing to be desired. Gillot has certainly done his work most splendidly; but, after all, is this not Japanese art translated by French process, and is it always at its best?

As art-work, one piece of Morse's pottery — the original work of Japanese hands — is, in the largest sense, worth many numbers of *Artistic Japan*.

[1] *Artistic Japan*: a monthly illustrated journal of arts and industries. Compiled by S. Bing, with the assistance of Mr. William Anderson, MM. Ph. Burty, Victor Champier, Th. Duret, Mr. Ernest Hart, MM. Edmond De Goncourt, Louis Gonse, Eugène Guillaume, Paul Mantz, Professor Roberts-Austen, MM. Roger Marx, Antonin Proust, etc. The English edition is under the editorship of Mr. Marcus B. Huish. London: Sampson Low, Marston, Searle & Rivington.

One Way to get a Gate. — An old tenant-farmer, on paying his rent, told his landlord that he wanted some timber to build a house, and would be much obliged if he would give him permission to cut down what would answer for the purpose. "No!" said the landlord sharply. "Well, then sir," the farmer went on, "will you give me enough to build a barn?" "No!" "To make a gate, then?" "Yes." "That's all I wanted," said the farmer — "and more than I expected." — *Timber Trades Journal.*

SOCIETIES

ENGINEERS SOCIETY OF WESTERN PENNSYLVANIA.

AT the monthly meeting of this Society, held May 21, a large and highly intelligent audience gathered, attracted by the promised light to be thrown on the graphophone and phonograph. The President, J. A. Brashear, occupied the chair. After the election of four (4) new members, Louis S. Clarke gave a very interesting history of the inception of the idea of fixing sound, and the progressive steps to the present graphophone, illustrating his words with diagrams on the black-board and showing the present position of the process by the instruments themselves, which for an hour sang songs, recited pieces, and repeated over and over, what was spoken into them. As yet its main use is to take the place of the stenographer, its record is correct and if the type-writer errs, he can go back to the graphophone and find his error. It is a wonderful invention and no one can say what its future may be. Meeting adjourned at 10 P. M. Next meeting to be held June 18, prox.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE NEW YORK CATHEDRAL COMPETITION.

NEW YORK, N. Y., May 31, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — At this time when competitions form such an important feature for the selection of designs for all buildings of importance, and are looked upon with so much favor by owners and committees having the selection of an architect at their control, as well as being responded to so universally by architects in general, a few suggestions relative to the advantage and weakness of the system, may not be *mal à propos*. During the past few years much advancement and progress has been made in "Instructions to Architects," whereby the scale, size and number of drawings, positions, angles and distances of perspectives, and the method of rendering are regulated and make the designs uniform and comparable; as regards size, cost and composition these requirements are very generally accepted and adhered to by the competitors, and there is little to be wished for in this branch, unless it be that those having the matter in charge should signify their preference for some particular style, when they are partial to any. Then the efforts of all might be directed in the same channel, thus giving a greater number for the owner to choose from and the exclusion of fewer because of their being of a style not acceptable. This would give to all the same opportunity and not handicap such as have had no personal knowledge of the likes and dislikes of owners or committees previous to receiving the information. The more minute and explicit the directions are, the more nearly will all the contributors hit the mark and more successful will be the competition. With all the advancement for the preparation of drawings, the judging them remains in the same unsatisfactory condition it always has been in, no steps having been taken for improvement, and consequently after each decision there is dissatisfaction among the defeated members, charges of favoritism and unfairness are made and evil is the outgrowth of what should engender only honest exertions and good-natured rivalry. Architects, being intelligent, are quick to see and admit a better thing when the judgment is just, but being human are slow to forget (a real or imaginary) unjust criticism; to avoid which the most particular pains should be taken. The designs should be sent sealed to the judges, and should be regarded by them as strictly private, no one (but the judges) being allowed to see any portion of them until the final decision is made public, (and not as is sometimes the case students, competitors, and strangers being permitted to examine them at leisure). When a decision is made, all the drawings should be on exhibition to the competitors and their friends. The greatest difficulty to overcome, is that of deciding which design offers the greatest advantages and is best fitted to be executed. The system of Judge and Jury of Courts, has been so long tried and is so nearly perfect, as a means of reaching the correct solution of intricate matters, that the same rules that govern the selection and workings of these may well be adopted as the best means of deciding competitions. The judge to be appointed by the owner or committee and the jurors selected from practising architects and engineers, who are not interested personally in the competition, and to be appointed by a vote of the competitors and to be satisfactory to all concerned; by this method, all the various features of the several designs would be picked out and properly weighed and placed to the credit of each competitor according to a carefully prepared table of points which should be named in the paper of instructions. This method would do away with the injustice that is often done to some contributions through the prejudices of one man for a particular school, and would bring about the result of making competitions much more effectual and satisfactory to the principals and architects. The feeling would then be among the members that at least their plans would have proper consideration and representation and stand or fall upon their own merits. The motto system is of but little value for the purpose it is intended (that of leaving the architects' identity unknown). The aim is to secure the best plan; and any architect can form a very good guess of the author of a set by his design, method of rendering, and individualities that must be visible to any one who would be likely to be called as a judge. If this is the case, it seems that a truer insight into the plans might be obtained by permitting each competitor to appear before the judge and jury and explain his plan to, and be examined by them. This method would insure a thorough examination into each design. It would be interesting to know how decisions are arrived at under the present system. They certainly do not always seem to be decided according to the real merit and are often unsatisfactory and extremely uncertain. Take for instance the competition of the Cathedral of "St. John the Divine." There were about seventy designs submitted by architects from home and abroad, among whom were such men as R. M. Hunt, H. M. Congdon, Potter & Robertson, R. W. Gibson, Withers & Dickson, J. C. Cady & Co., Renwick, Aspinwall & Russell, R. M. Upjohn, C. C. Haight and McKim, Mead & White. The name of any of them would be a guaranty of an imposing edifice, all of them having had great experience in church architecture, and are able to show many examples of their work; and yet in the decision, Messrs. Potter & Robertson is the only competitor in the above list that has received mention, the other names being comparatively unknown, and without examples of their work to give confidence that they are able to carry a building of that importance to a successful completion if the work should be intrusted to the care of one of them. The fairness of the decision cannot be admitted, or disputed, until all the designs are exhibited which it is hoped they will soon be, thus assuring the defeated competitors and the profession generally that the judgment has been free from bias. It is a remarkable coincidence, it might almost be said an improbable one, that the lay committee should have selected three designs, and afterward, the expert examiners should likewise have chosen the same three and added a fourth, unless preference had been expressed, or those selected are decidedly the best; but to many it must appear strange, that three of the successful competitors are men recently established in business and that but one of the older and more experienced members of the profession, has been able to furnish anything equal to theirs. Where are we to look for an explanation of three "dark horses" having outrun all the established records. Is it the decline of the older architects, the more than remarkable progress of the coming man, or as they stand are competitions failures?

A NON-COMPETITOR.

[As our correspondent remarks, "the fairness of the decision cannot be admitted or disputed," and need not be, as people know almost nothing about the manner in which the actual decision was made. The tenor of the foregoing remarks, if we rightly apprehend their drift, seems to imply a veiled allegation that in some way the experts are responsible for the existence of a "remarkable coincidence" seeing that the reporters of the daily press have thought fit to assert that the choice of the experts coincided with that made by the trustees. It seems to us that until the experts' report is published all criticisms upon the conduct of this competition should be classed with the statement of the New York *Star* which alleged that "two of the committee of three experts who passed upon the plans of the church were not qualified by education or training for their duty!" — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

WESTERN LAKES DRYING UP. — The lakes in eastern Oregon, as well as in Nevada, are drying up. In some instances the water in the lakes is subsiding because the streams which empty into them have been diverted from their natural channels for the purposes of irrigation, but the continuous drought, doubtless, has had much to do with the low stage of water in them. The *Herald*, published in the new county of Harney, Oregon, says not over four square miles of the original bed of Warner Lake is now covered with water, whereas in 1865 there were seven feet of water where the land is now dry, and this spring a stack containing 300 tons of hay was burned on land which in 1874 was surveyed as Warner Lake. Goose Lake, which once reached Lakeview, Oregon, is now five miles away, and Malheur Lake, in Harney County, is eight feet lower than at any period within the memory of the oldest inhabitant. In this county Humboldt Lake, which some years ago comprised a sheet of water sixteen or eighteen miles long and from eight to twelve miles wide, is now only a few miles long and perhaps a mile or two wide. The Humboldt has not discharged any water into the lake for several years, and a large area, which was covered several feet with water at one time, is now as dry as any other part of the Humboldt Valley. It is a fact, however, that the lake was as low nine or ten years ago as it is to-day, and that five years ago it was as high as it was ever known to be. Immigrants in early days who saw the Humboldt discharge an immense volume of water into the lake, or "sink," as it was called, believed it had a subterranean outlet; but that idea was erroneous, as the volume of water was reduced by evaporation, not drainage. — *Winnemucca (Nev.) Silver State.*

The Suez Canal.—It appears that the number of vessels which passed through the Suez Canal last year was 3,440, of a gross burden of 9,437,857 tons. The corresponding number of vessels which passed through the canal in 1887 was 3,137, of an aggregate burden of 8,430,043 tons; and in 1886, 3,100 vessels, of an aggregate burden of 8,183,313 tons. The transit revenue collected last year was £2,593,201, as compared with £2,314,404 in 1887, and £2,261,035 in 1886. Of the vessels which passed through the canal last year, 2,625 were British, 187 French, 146 Italian, 103 German, and 121 Dutch. No other country figured in the list for 100 ships. The proportion of British vessels passing through the canal is increasing, having been 2,625 in 1888, as already indicated, 2,330 in 1887, and 2,331 in 1886. It will be seen that Great Britain figured for 76 1-4 per cent in the whole movement of vessels through the canal last year; the French proportion being 5 1-2 per cent; the Italian, 4 1-2 per cent; the German, 4 3-4 per cent; and the Dutch, 3 1-2 per cent. It is certainly not a little remarkable that, although the canal was made with French capital, Great Britain has secured the lion's share of the benefits resulting from it. Of the 3,440 vessels which passed through the canal last year, 1,608 went through during the darkness of night.—*Engineering.*

Secret Writing by Means of Typewriters.—A device for secret writing by means of the typewriter is mentioned in the *Paper World* as a recent invention. It requires two typewriters similarly adjusted. They are so constructed that the type can be shifted from their normal position, so that the operator, striking the key in the usual way, really writes other letters than those in his copy, forming a cipher copy. The receiver adjusts his machine in an opposite direction, and writes from the cipher copy, and his machine records the letters of the original copy. The principle is very simple, says the *Mechanical News*, and it at once suggests the possibility of applying the principle of the combination lock to such a contrivance for all typewriters, so that each owner of a machine can set it to any combination, which only he and his correspondent should know. This must be feasible, and if the new invention is of any use at all, its usefulness would be much increased by such a plan.

The Action of Creosote on Chimney Flues.—Attention has lately been called to the peculiarly corrosive, and consequently destructive, effect of the creosote of wood soot upon chimneys, owing to the fact that the creosote thus formed from the slow combustion of wood contains so large a proportion of pyroligneous vinegar or crude acetic acid; this acid being formed in large quantities when the combustion of wood is slow, many grates, in fact, being condemned in cold weather where a large wood fire is very much checked, only a few hours being required for such condemnation. The acid in question dissolves lime readily, carrying it away in solution, and in this manner the mortar is frequently entirely removed from the tops of chimneys in the country, new ones suffering in the same way as the old, instances being numerous where the top courses of brick in chimneys only two years old have become entirely without support other than that afforded by the sand with which the lime was mixed.—*Philadelphia Press.*

Animal Life in Well-water.—The fauna of well-water, as shown by Professor Vejdovsky's examination of 231 wells of Prague, comprises 111 species of organisms, including 20 varieties of amœba-like organisms, 12 varieties of flagellate infusoria, 15 varieties of other infusoria, 21 varieties of worms, and 10 varieties of crustacea. These varieties are washed by surface water into the wells, where they live in the mud on the bottom, their presence in the water above being indicated by a turbid appearance. Danger from wells containing them arises chiefly from the putrefying organic matter supporting them, which greatly favors the development of fungi which prey upon the human body.—*Exchange.*

The Babylonian Expedition.—Since the beginning of February, the Babylonian expedition sent out by the University of Pennsylvania has been exploring the ruins of Niffer, whose site is marked by an immense mound, about sixty miles southwest of ancient Babylon, and bordering on the Affoosch swamps, so-called from the tribe of Affik Bedouins that dwell near by. Niffer is identical with old Babylonian Nippûr, founded about 3,000 years before the Christian era. In its ruins lie buried the remains of the famous Bel temple, which will be systematically explored and doubtless yield splendid results.—*Jewish Messenger.*

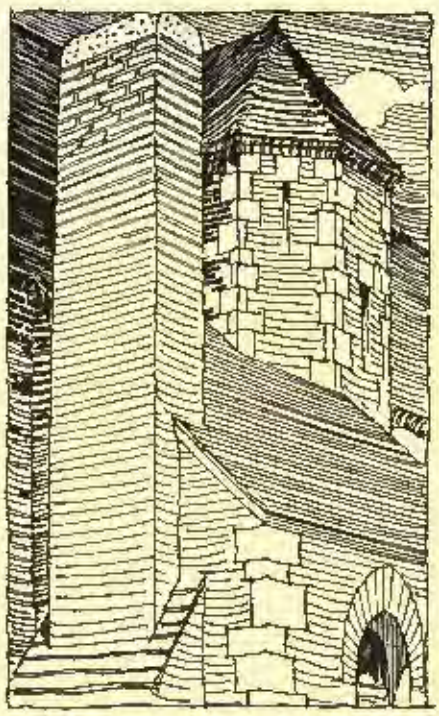
Ancient Tombs discovered at Naples.—A subterranean chamber has been discovered under a house on the hillside at Naples. Along the centre runs a mosaic pavement and on each side there is a double row of sepulchres hewn in the rock, the fronts of which are stuccoed and painted and decorated with terra-cotta and marble reliefs. Within the tombs were perfect skeletons, vases and other objects, the antique lamps being in such good condition that when the new find was inspected by a party of German archæologists the workmen made use of them to light up the vaults. The many well-preserved inscriptions are chiefly in Greek, with some Latin, and prove that the epoch of these tombs was about 1,000 B. C. Other tombs in a second chamber have not yet been excavated. Similar catacombs have heretofore been found in this locality.—*Pall Mall Gazette.*

The Egypt Exploration Fund.—Few educational enterprises have yielded larger results for the amount invested than the Egypt Exploration Fund. Expending annually since 1883 between $7,000 and $8,000, it has discovered or disclosed the following interesting sites; Pithrom (the treasure city of Exodus i, 11). Goshen Tahpanhes (the Daphnæ of the Greeks), the city of Onias, Zoan, Am, Naukratis, and, latest of all, Bubastis (the Pi-Beseth of the Scriptures). These discoveries have been conducted in a thoroughly scientific manner and have yielded rich results regarding the sciences, arts and industries of past ages, the early sources of Greek history, and particularly Biblical and secular history.—*The Chautauquan.*

TRADE SURVEYS

A vast amount of projected work depends upon the establishment of, or rather, the restoration of, confidence among investors, native and foreign. Years ago, the bulk of railroad construction was done out of the pockets of outsiders. Now it is done mainly out of the earnings of existing companies. Home investors are incredulous and suspicious, and many foreign investors are quietly refusing to part with their money in new American railway enterprises. Notwithstanding these things, the streets bear rumors of parallelling schemes under the management of parties deeply interested in existing lines, and these rumors aver that these new roads are to be built to depreciate the stocks of established lines, in the interest of huge stock-jobbing speculators. Be they true or false, they go to show that the arena of conflict between opposing speculative interests is to be widened and lifted out of the old ruts. These schemers assert that speculative capital must have employment, and that there is no more inviting field for its operation than in hammering down values on old lines by the so-called-for construction of new ones. The effect of such a policy would naturally be to reduce the capitalization of a vast amount of existing railway property, and on the outside public the results would be rather beneficial. Wild as such a scheme may appear to be, its conception is natural and logical, and its outcome would probably be a consolidation in greater or less degree of existing competing lines. In fact, this very result has more than once been predicted by leading railway authorities as inevitable and desirable when the inevitable arrives. The mob spirit has astounded capital thus far in much of the construction that has been done. Scientific or economic considerations have played a minor part in the work. The result has been a withdrawing of small investors on one hand, and a precipitation of tariffs on the other, accompanied by protective legislation and agencies in the shape of commissions. The point on which large investors are most concerned is: How can the railroad problem be so disposed of as to open up safe and abundant opportunities for investment? This element has favored contentions to that end. Up to present writing they have not answered expectations. Railroad companies are disposed to monopolize all good opportunities, and to build roads before they are needed to that end. There are paper roads now built over 40,000 miles long. Some count over 50,000 miles. It is said in financial circles there is enough money to build them. It is demonstrated that labor, material, machinery and equipments are as low as they are likely to be for years; hence there is no risk in building new lines if the builders can afford to wait. But right here is the secret. The brains want just enough outside capital in their companies to kick in or out, up or down, as it suits them, and in this way, by temporarily depressing stocks and compelling these outsiders to sell out at a sacrifice, to make their roads cost them practically so much less. In short, outsiders are to be let in to help build new roads, and then be kicked out, with a dime for their dollar. Englishmen see and stay out. For all this, there will be enough sheep to help out this programme. The manipulations are being shrewdly carried on. Commercial indications are favorable. The volume of business is ahead of last year, though just now freight shipments East over the trunk-lines are one-half what they were last year. Money is extremely active, loans at New York one day last week reaching the highest known limit of $412,500,000. Considerable gold shipments have been made lately, and the English banks now hold fifteen million dollars more than last year.

The earnings on seventy-three roads for third week of May show a slight increase over same week last year. The iron trade shows more strength. Last week 90,000 tons of steel-rails were sold, and there are inquiries for about seventy thousand tons, for new roads mostly. Crude-iron production is maintained throughout the country, but the Northern furnaces are restricting while Southern are expanding output. The month of June will be a good one among makers of pipe, plate, sheet and structural iron. Producers of anthracite coal have advanced prices 10 to 25 cents East, West and South. Output up to date is 1,312,453 tons less than last year. Soft and splint coal production is about the same as last year. Strikes have temporarily restricted output in a few localities, but this is made up elsewhere. The lumber trade is active, and for the most part prices are maintained. Lake and coast tonnage craft are crowded with contracts. Prices have weakened at some points. One of them Chicago. One reason is that hardwoods are crowding out softwoods. New kinds of wood are being used for flooring, ceiling and general interior finish. Even yellow pine that promised to sweep white pine out of the market for interior work is itself feeling the pressure of other and more desirable kinds. Eastern Michigan lumber manufacturers will cut 200,000,000 feet less than last year, and mills will probably shut down September 1. The action of the poplar association in raising prices is generally favored among middlemen who hope thereby to increase their margins. Indian and Chinese labor is being extensively used in British Columbia to manufacture lumber to the disadvantage of competing interests on the American side, and Norwegian sailors are monopolizing the ocean traffic. Alaska cedar of a quality fat superior to Puget Sound cedar is being introduced on the Pacific coast. It cuts 50 per cent clear. South American lumber markets are taking large quantities of spruce and pine from American and Canadian markets, and also large quantities of the best lumber on the Pacific coast. The Liverpool, England, market is calling for heavier supplies of American lumber, soft and hard; poplar, walnut and Southern pine are particularly wanted. British markets are absorbing much larger quantities of lumber, and dealers are carrying more abundant supplies. In manufacturing circles on this side predictions continue to be made of an advancing tendency in raw and finished markets. The most impartial observation fails to develop strong arguments in support of this view. Producers in all industries have brought about a co-operation of effort that makes a gorging of trade channels next to impossible. Years ago there was no machinery for such purposes, and there was besides a lack of confidence. Disasters and depressions have taught business interests to hang together, and it is this fraternization that saves losses and gives to trade movements a greater regularity and certainty. Hence it is that no sudden expansion of values can be reasonably looked for; besides capacity is equal to an extraordinary demand. It is this trade combination that accounts for the carrying of more moderate stocks, and for the policy now so generally pursued of working on orders. Viewing the industrial problem from every side, it is impossible to infer with good reason that a sudden expansion of values is probable. The reaction in Great Britain to stronger prices is simply a return to normal values. That activity will probably continue a long time because distant regions are being filled up with an enterprising and industrious population whose labor under these new conditions will be much more productive than under former crowded conditions when competition restricted earning power at minimum limits. In our own land all the agencies available are working in the direction of lower prices, in spite of the eradicating tendencies.



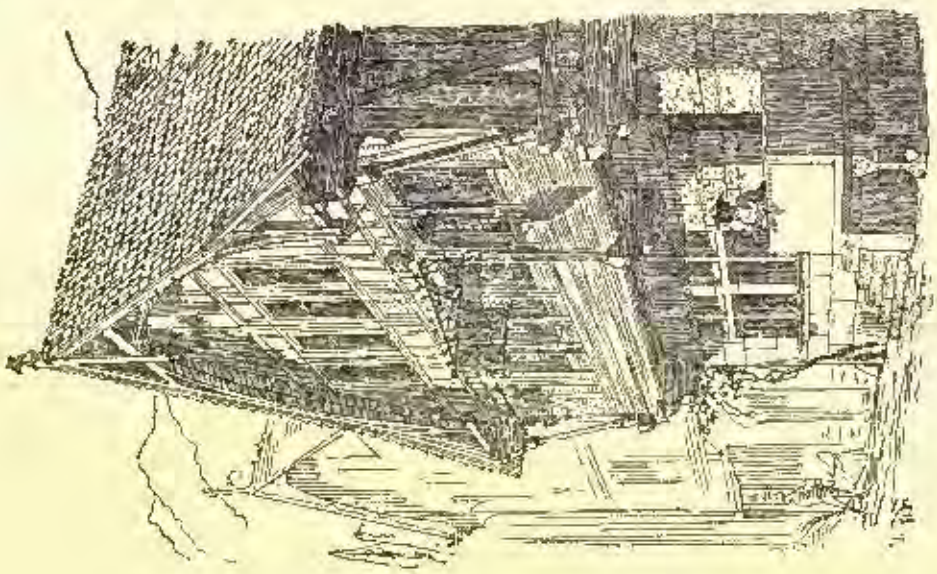
CABOT'S BRICK PRESERVATIVE

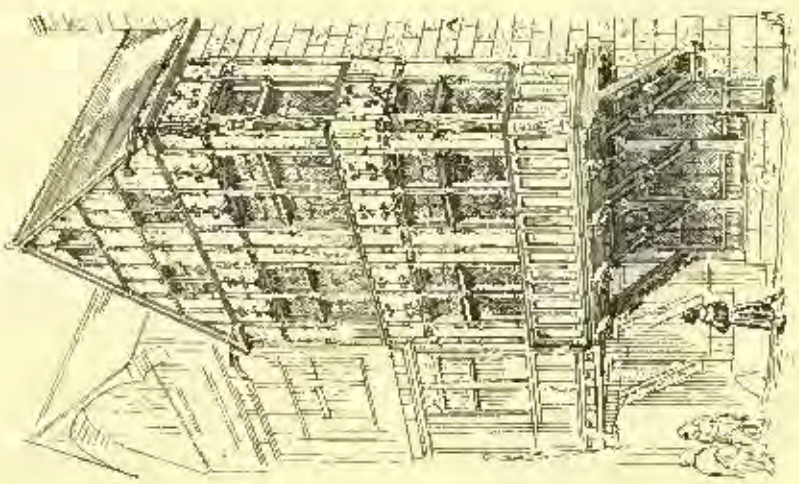
THIS IS A PECULIAR COMBINATION OF INDESTRUCTIBLE GUMS WITH AN OILY SOLVENT WHICH PREVENTS THE PENETRATION OF WATER INTO EITHER BRICKS OR MORTAR: IT GREATLY IMPROVES THE APPEARANCE OF BRICK-WORK, GIVING IT A RICH EFFECT, FREE FROM GLOSS: THE WHITE EFFLORESCENCE OF SALTS ON THE SURFACE AND THE FORMATION OF FUNGUS IS PREVENTED: AS IT IS MUCH MORE IMPERMEABLE TO WATER IT IS FAR BETTER THAN LINSEED OIL, AND IT IS NOT DESTROYED BY THE LIME OF THE MORTAR: WE CAN RECOMMEND IT FOR USE ON CHIMNEYS, AS IT WILL PREVENT THEIR DISINTEGRATION BY DRIVING RAINS, WHILE SUPERIOR TO THE BEST PAINT FOR THIS PURPOSE, IT IS ALSO MORE ECONOMICAL:

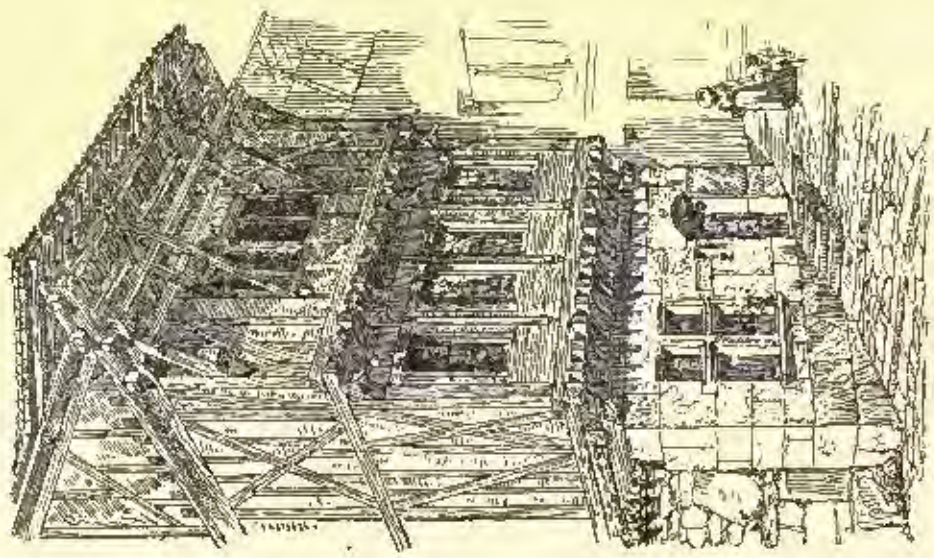
ADDRESS ORDERS AND INQUIRIES TO

SAMUEL CABOT: 70 KILBY ST. BOSTON

ALSO MANUFACTURERS OF CREOSOTE STAINS & ANTIPYRE







HALF-TIMBER HOUSES AFTER VIOLLET-LE-DUC.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 15, 1889.

Entered at the Post-Office at Boston as second-class matter.

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BY special authority from the legislature, the city of New York is to be allowed the sum of four million dollars, or more, to be spent in renewing and repairing pavements during the next three years, and some of the daily papers are indulging in what appears to us very rash expectations as to the result of the expenditure of so much money. It is not that there is no one in New York who understands the art of paving streets, for from New York have come some valuable contributions to the literature of the subject; but an American who supposes that the lavish distribution of municipal funds implies any particular benefit to citizens in general shows an ignorance of "practical politics" which we should hardly look for in a metropolitan journal. In other countries the object of paving city streets is usually the diminution of the noise, dust and labor of traffic through them, and the systems which accomplish this result most effectually are those most favored by the municipal authorities. With us, on the other hand, the primary object of pavements appears to be the furnishing of employment to as many voters as possible, and for as long a time as possible, and that pavement is the most favored which provides this with most certainty. Next to the political value of a pavement, the most important point, according to the testimony of some of the persons who ought to know best, is the prospect of financial advantage which it offers to the persons who decide whether it shall be used, and in this respect the patented pavements offer attractions which are generally in inverse ratio to their value to the public. The proprietors of those patents, it is true, usually make brilliant promises about their goods, apparently as a sort of sacrifice to public opinion, but as the promises are not fulfilled, and the people in authority are quite willing that they should not be, the result to the public is simply the continuation of the costly and miserable system under which it has suffered for so many years. It is not so very long since we saw, for some days before an election, the watering-carts banished from Broadway, and their places supplied by a horde of men with watering-pots, for the avowed purpose of gaining votes for the party in power, and the inner history of the paving-departments of our large cities would probably afford more details of this sort of political management than any other branch of our public administration. Of course, it is useless to expect any real service to the public from such a system, and experience shows that the greater the amount of money to be distributed, the more shameless is the impudence with which it is stolen, or used to keep thieves in office. If the people of New York, or rather, those who rule them, really wish to extricate the city from its disgrace as the worst-paved city in the civilized world, they can easily do it by authorizing a commission of men who understand something about the matter, and who will not under any circumstances steal their fellow-citizens' money, to find out what is best, and have it applied to the streets in the best way, and at an honest price. It is hardly necessary to say that every other town that has tried the experiment thoroughly has come to the conclusion that natural rock-asphalt, on a concrete foundation, is the best pavement yet devised. In this country asphalt has been sedulously disparaged by persons interested in other pavements, and discredited by the failure of multitudes of pretended "asphalts," consisting of coal-tar and sand, but the fact remains that in certain places in New York and Boston, where the natural asphalt has been laid by private enterprise, it has resisted for years the heaviest traffic, while stone pavements around it have been ground into dust. With such examples constantly before them, joined to the experience of foreign cities, and the almost unanimous testimony of expert writers, it would be incredible, if it were not for the exigencies of politics, that the municipality of Boston should go on, year after year, shovelling soft sand and pebbles on its most fashionable streets, to be immediately reduced to a mass of filth, through which ladies wade and carriages plough, until it is dried up and blown away in dust, to be replaced the next year by another dose; or that New York should be content to receive its foreign guests into the unspeakable mire of West Street, with the cool explanation, to people fresh from Piccadilly or the Rue de la Paix, or the quais of Genoa, that the "traffic" of Beacon Street or Sixth Avenue renders it impossible to maintain anything on either of them but a pavement of soft mud. It is often alleged, as an argument against the use of asphalt-pavements in this country, that when wet they are slippery, and, therefore, dangerous to horses, but General Gillmore found this notion quite unfounded, statistics showing that the accidents to horses on asphalt pavements were no more frequent or more serious than on stone blocks, while the labor of traction, and the danger of distressing and overstraining horses, is far less. It would be well worth while, even if the benefit to the nerves of the citizens which would follow from the adoption of smooth-pavements, over which carriages, perhaps with rubber tires, like those now being introduced in Berlin, would roll almost noiselessly, were considered of no importance, for some one to reckon the saving to the New York express companies and teamsters of time and horseflesh incident to the substitution of a good asphalt roadway, kept clean, for the present pavements. Very little can be accomplished in this country for the public good in the abstract, but the mention of dollars would cause the express companies to prick up their ears, and such a demonstration as might be easily made of the unnecessary tax which they pay every year as a tribute to the ignorance and dishonesty of paving-departments would convert them into zealous friends of a reform which has been too long delayed.

WE all know something of the "brick-veneer" buildings so common in some parts of the West, and by no means unknown in the Eastern States, in which a frame covered with boarding is cased with a four-inch wall of brick, held to the boards by nails driven in the joints of the brickwork, but every one may not be aware that this, so far from being an invention of our own degenerate times, is a revival of a somewhat similar practice of, perhaps, the sixteenth century. In a lecture delivered some time ago by Mr. Lacy W. Ridge on the English half-timbered houses, the lecturer said that on the advent of the real Queen Anne style, which was nothing more nor less than an imitation of the buildings in Holland belonging to the Dutch friends of the Prince of Orange, the English proprietors of half-timbered houses who wished to conform to the new fashion very frequently veneered the fronts of their buildings with a brick façade after the Amsterdam pattern, leaving the half-timber work substantially intact behind it, where it may still be found by the curious architect. In the southern part of England a still simpler method of converting the antiquated wood framing into the new brick style was in vogue, consisting in the veneering of the wood and plaster work with narrow tiles made to imitate the face of a brick, and rebated at the upper and lower edges, so that they lapped over each other. They were made soft, as English bricks and tiles still are, so that they could be nailed through the upper edge, and the rebate of the tile above covered the heads of the nails. How the stone window-sills were managed in this case we are not informed. With our veneered fronts, the stone sills and lintels, if any are used, can be made four inches thick, and will stay in place tolerably well; but the art of making a stone sill half-an-inch thick, and nailing it to a timber construction, if it ever flourished, has been lost.

A CURIOUS scheme has been started in New York. Some one, who wishes, apparently, to combine the pleasures of being cremated and being buried proposes to build an immense "mausoleum," containing cells for forty thousand bodies, which are to be "desiccated" by a current of dry air, and preserved in this condition for an indefinite period. The advantage of being desiccated is that if a person does not happen to be dead when he is placed in the cell, the desiccation does not hurt him, as cremation or being buried would, and he can lie there comfortably, breathing the dry air, until some one comes to let him out. Another alleged merit of the system is that the faces of the people treated by it will remain "without discoloration or material change," so that their friends may have the satisfaction of seeing them at any time. The building is to be constructed of concrete, with a facing of stone, and might at least be made an imposing architectural object, whatever may be the success of the chemical processes involved.

M. FÉLIX NARJOUX has published a little book, containing his observations on modern Italy, as seen by an architect during a tour of professional inspection. Among other things, M. Narjoux gives some particulars in regard to building speculations in modern Rome which are curious, even to an American. In 1870, Rome was a quiet papal city of one hundred and forty-five thousand inhabitants, filthy, crowded and unhealthy. On the twentieth of September in that year the Italian national troops took possession of the town, after a few hours' bombardment, and its rejuvenation began. The Italian court first took up its quarters there, the King and his family occupying the Palace of the Quirinal, while the members of the suite accommodated themselves as best they could among the dirty rookeries whose owners were willing to take the invaders as tenants. With the court, however, came a multitude of merchants, working people, and others who had been dependent for their living upon the court patronage, and these found themselves almost without shelter. A demand for new houses arose in consequence, and building began in all directions. The increase of population often reached twenty thousand in a year, and the new comers found homes for themselves, according to their rank and wealth, in various portions of the town. The northern suburb of the town, comprising the high region of the Quirinal and Esquiline hills, near the royal palace, was appropriated by the richer ones, and here were built the new railway station and such new Government offices as were found necessary; while the poor immigrants were obliged to content themselves with the territory around the Colosseum and the slope of the neighboring Cœlian hill, or seek more distant quarters near the Vatican; and the southern part of the town, beyond the Baths of Caracalla, was taken up by manufactories. The region of the Quirinal and the Esquiline, which contained the best houses, was the first to be built up. A wide street, the Via Nazionale, was laid out to connect it with the old portion of the city, and the price of land on this street increased enormously. Lots which were worth in 1870 about twenty cents a square foot soon advanced to six or eight dollars a foot, and, even after the speculation had got well underway, a building which was completed in 1880, at a total cost of sixty thousand dollars, was sold for eighty thousand, resold for one hundred thousand, then sold again for one hundred and twenty thousand to its present owner, who offers it for one hundred and sixty thousand, and is sure of finding a purchaser at that price. As usual in such cases, the best property has proved to be that used for retail business. While the huge apartment-houses, which were built in great numbers, have of late been unsalable and unrentable, the shops on the Via Nazionale grow every year more crowded with customers, and, therefore, more valuable to their owners and tenants; and even the old business streets, like the Corso, have revived, so that a lot on this street, which is to be occupied by a new dry-goods store, after the fashion of the Bon Marché in Paris, was sold for twenty dollars a square foot. It is curious that these new structures, which reoccupy the site of the busiest part of ancient Rome, are in many cases rendered very costly by the difficulty of obtaining a good foundation in the vast accumulation of débris which covers the ruins of the imperial city. It is not at all uncommon to find a distance of sixty feet between the present surface and the natural soil below, while the foundations of many buildings have been carried down seventy feet, so that the cost of the foundation often exceeds that of the entire superstructure.

THE Louvre has just come into possession of the tomb of Philippe Pot, one of the great Burgundian nobles of the fourteenth century, which has for a long time been one of the principal curiosities of Dijon, and, with its eight monks, with deep hoods, carrying the figure of the dead knight on their shoulders, is known from photographs and drawings to many of our readers. The tomb, which is one of the best existing specimens of the remarkable Burgundian school of sculpture of the thirteenth and fourteenth centuries, has had a rather singular history. It was originally set up in the abbey of Citeaux, and is supposed to have been the work of some of the monks of the convent. In 1791, as we learn from the account given in *La Semaine des Constructeurs* by M. Rivoalen, it was taken from the monastery to one of the churches of Dijon, which had been officially set apart as a repository of public property. Some time afterwards, in a way which is not explained, the tomb appeared in the hall of the residence of the Count de V., at Dijon, and here it remained without objection until 1886, when the descendant of the Count who first exhibited it as his own expressed a desire to sell it. When this was announced, the archæologists of Dijon took alarm, and endeavored to find some means of preventing the Count from carrying out his intention. The first step was to persuade the prefect of the Department of Cote-d'Or to bring suit for the recovery of the monument, on the ground that it was public property, which had been unlawfully removed from the State depository, and was subject to reclamation at any time. The first court which considered the case decided in favor of the prefect, but the Count appealed to a higher tribunal, which reversed the judgment of the court below, holding that the undisturbed and unquestioned possession of the tomb by the Count and his ancestors for eighty years or more, without any suspicion of having obtained it wrongfully, entitled him to the protection of the right of prescription granted by the Code. The Count, however, having established his right to the property, offered it at a reasonable price to the Administration of the National Museum, which immediately purchased it, and put it in the Louvre, with the rest of the fine collection of mediæval sculpture which is stored there.

THE wooden-nutmeg industry seems to have fled from Connecticut to establish itself at Cologne, where a manufacturer announces that since 1884 he has devoted himself exclusively to the construction of machines for making artificial coffee, and is now prepared to furnish these useful articles in any quantity. As an inducement to purchasers, he offers to present with each machine a recipe for preparing the material, and adds that although the sale of adulterated food is visited with severe penalties in Germany, there are many countries where such obstacles to trade do not exist, and where the enterprising possessor of one of his machines may enjoy the liberal profits due to the exercise of his skill, without fear of having his career interrupted by criminal proceedings. The material used in these machines is roasted Indian corn, or some other nutritious cereal, which, on turning a crank, is carved into grains so closely resembling those of the roasted coffee berry, after the usual grinding, that they cannot be distinguished from them, and can be sold for them without fear of detection, unless the buyer applies some chemical or microscopic test. Of the two, the microscopic test is by far the best. If suspected grains are thrown on ether, they will float for a time if genuine, but will sink immediately if composed of roasted cereals without further falsification, but by greasing the artificial coffee, so as to confer upon it something of the oily nature of the real berry, it will behave in the same manner under the test.

WE mentioned some time ago the frankness with which the editor of the *Wiener Bauindustriezeitung* spoke of the results of his investigation into the merits of the "Miraculous Carbon-Soda Stove," which he had had set up in his office for a thorough test. The memory of what he went through at that time in the pursuit of knowledge seems to have rankled in his mind, for we find in a recent number a note about the "suicidal stink-pot" known under the name of the "Miraculous Carbon-Soda Stove," saying that the Vienna authorities, in a special meeting, had ordered that the sale or use of the apparatus called by that name should be forbidden, on account of its dangerous properties.

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND.—I.

WILLIAMSBURG.—THE TOWN.

THE ancient quiet of this old place, the residence-town of the royal governors and officers of the crown in His British Majesty's colony of Virginia, has been little disturbed by the irreverent onslaught of nineteenth-century progress, and as the English traveller, Burnaby, wrote of it in 1759, "a pleasant little town with wooden houses and unpaved streets," so will the modern wayfarer find it — an eminently respectable and highly conservative old burgh, proud of its vanished greatness and of its years. The railroad, which sets one down from Richmond or Hampton, merely skirts the outer edge of the town, and, being out of sight, obtrudes itself upon the general quaintness and age of the place only by the infrequent rush and clatter of a passing train. From the veranda of the inn one has a very agreeable first impression of a long stretch of wide "dirt-road," bordered by two rows of trees, and having a straggling, broken line of rather low and small old brick or wooden houses on either hand.

This is Duke of Gloucester Street, a pleasant, high-sounding old name, which invokes in the mind of the tourist in search of the picturesque a sense of lively gratitude toward the old burghers for not having christened their single important thoroughfare in the more usual commonplace way.

Williamsburg was founded, under its original name of Middle Plantation, in 1632, through an order granting fifty acres of land and exemption from general taxation to any one settling there.

In August, 1676, when General Bacon and his victorious army of rebels encamped there, it was only a small village of straggling little houses.

Bacon had driven Governor Berkeley to refuge in Accomack, defeated the Indians, and made himself master of Virginia. He now called a great convention together at Middle Plantation, and, after a powerful harangue and a stormy debate, which lasted from noon to midnight of August 3, persuaded those present, among whom were several members of the royal council and many "prime gentlemen" of the colony, to sign a declaration of their determination to stand by General Bacon, to "rise in arms against" Berkeley, who was denounced a traitor and a rebel "if he with armed forces should offer to resist the General; and not only so — if any forces should be sent out of England at the request of Sir William or otherways, to his aid, that they were likewise to be opposed"—and much more of a like revolutionary tenor. The scene was one of the most striking and significant in the early history of the colony.

In 1698 Governor Nicholson removed the seat of government from Jamestown, then "containing only three or four good inhabited houses," to Middle Plantation, where he planned a large town, whose streets were designed to form the letters W and M, in honor of their Majesties, William and Mary of England — a conceit never carried out.

Williamsburg was thenceforward the scene of the most important incidents in the growth of Virginia, and, though never attaining any greater importance as a town than it now has, was ever thought a pleasant place to live in, and has numbered among its residents or visitors many great and famous men.

A WREN COURT-HOUSE.

In the immediate foreground, as one looks westward up the long, wide street, lies the old "bowling-green," a generous, unenclosed square of smooth, close-cropped turf, on one side of which, and fronting upon the street, stands the court-house, a quaint little bit of architecture commonly accredited to Sir Christopher Wren.

The building is a simple oblong in shape, and of one story in height. The walls are substantially built of small English brick of a very pleasing dull-red color. The windows, high above the ground, are tall and narrow, and all the openings are crowned by semicircular arches, the dark, glazed brick used for header voussoirs accentuating them in a simply effective way. The spandrels are now filled-in with painted boards, which have doubtless taken the place of the original round-headed sash and fan-lights. Where the thickness of the wall is reduced, at the floor-level, the offset is covered with a rounding moulded brick. There is a wide stone platform, with three steps to the ground, before the doorway, over which projects the roofed pediment of a portico, of which the columns are wanting. There is no evidence that they were ever in place, nor does the eye miss them greatly after it has had time to become a little accustomed to their absence, which is, at first, strikingly conspicuous. A wooden cornice, composed of a few simple mouldings, is carried around the building. The eaves have a moderate projection. The double-sloped roof is crowned with a tall octagonal lantern of graceful form, terminating in a wooden finial surmounted by a wrought-iron vane of rich workmanship. On the stone steps are grouped some idlers, listlessly talking and chewing as they bask in the faint November sunshine. Court is in session within, and, as we pass, the crier comes out upon the platform and calls aloud in booming tones a string of names.

The trees which stand beside the walk all up and down the street are very beautiful and effective in shape, and all the more interesting when one learns that they are mulberries, and the relics of a craze which from time to time played a not insignificant part in Colonial Virginia, and, in fact, throughout all the thirteen colonies. Attempts to grow the silk-worm were renewed again and again in spite of failures, and the successive trials were continued over a period of about one hundred and sixty years, reaching down to the beginning of the Revolution. Mulberry trees were planted everywhere. One finds them in numbers about the great old manor-houses on the river, and here they picturesquely adorn the Duke of Gloucester Street in the capital itself. The craze came over from England, as did everything else in those days, where it originated in an effort of the merchants to escape the paying of good English gold for shining silk,—that coveted product of fair France. The

Jamestown people had a try at the mulberries, and sent some silk to England, creating a tremendous excitement among the enthusiasts "at home," and so encouraging the hopeful that, in 1620, a lot of French silk-growers were sent out to give the experiment a fair trial in Virginia. Nothing seems to have come of this enterprise, and the stirring times of the Indian massacre of 1622 doubtless drove the skilled "vignerons" away to sunny France again.

Charles the First was always interested in the silk-growing, which he encouraged in his own ineffectual way. It went on under the Commonwealth, and we find good Edward Digges, in 1655, turning out as much as four hundred pounds of fine silk. Later, the House of Burgesses passed a law requiring the planting of one mulberry-tree to every ten acres of land. Great rewards were promised successful growers. In 1668 we hear of three hundred pounds sent over as a present to Charles the Second. Then there came a period when the caterpillars languished and died, and the Burgesses undid the law as to the compulsory planting of mulberry-trees. There was another mulberry revival when the Huguenot refugees came over, and in 1730 more silk was sent home to England; but nothing came of it all at last, except the grand old gnarled and knotted boles and spreading branches of the trees, which we find composing effectively into foregrounds in these ancient places.

CHRIST CHURCH, BRUTON PARISH.

Not far beyond the court-house is old Bruton Parish Church, standing within the walled enclosure of its "God's acre," and rearing its graceful, Wren-like tower amid the spreading branches of the ancient trees. Our eighteenth-century Englishman, Mr. Burnaby, has set down old Bruton as "an indifferent church," but then it was comparatively new in his day, and had scarce yet felt the beautifying touch of time.

The vestry-book of the parish of Middlesex in the year 1665 contains an entry directing the building in Middlesex of a church similar to the church of Bruton Parish. That this was a wooden building seems likely from an entry in the Bruton records of 1678 giving the list of donors to a new brick church, headed by John Page, who gives twenty pounds in money and the land for church and churchyard. The name of Bruton seems to have been originated by Mr. Sudwell, who so called the parish in memory of his birthplace at Bruton, in Somerset, England. He also gave twenty pounds toward the new building, and Philip Sudwell twenty pounds, and many others gave five pounds. And John Page was allowed to put up a pew in the chancel, where there was also one for the minister.

As soon as the church was dedicated, the vestry made it known in the community that it was intended to enforce the penalty of so many pounds of tobacco against those who failed in their attendance at church, and it is to be presumed that delinquents were few thereafter.

There seems to have been from the first a great struggle between the royal governors and the church people as to the induction of their ministers. The Governor, as representative of the King, was the nominal head of the church, and, as such, claimed the right of the appointment of ministers, and was otherwise inclined to interfere with the functions of another great personage, the Commissary of the Bishop of London. There was much unseemly squabbling over this matter between these rival powers. In 1696 the salary of ministers was fixed at sixteen thousand pounds of tobacco, in lieu of £100 per annum, which, the parishioners had complained, they were unable to pay. The incumbents of Virginia livings were not, as a rule, men of a high order, if we may believe the traditions of their profligacy. One is said to have fought a duel in his churchyard to settle a quarrel at cards, another thrashed his contumacious vestry, and then preached them a sermon celebrating his victory: swindling of tradesmen, gambling, and attendance at horse-races and cock-fights seem to have been quite common among them, and, finally, the evidence is unmistakable that they all, to a man, got gloriously drunk at dinner whenever they could. These, indeed, were the manners of the times, and perhaps the worthy parishioners were not so shocked as one might suppose by this unministerial behavior of their clergy. However, the faithful continued the struggle with the governors until they finally won the right of hiring their parsons from year to year, a system which, no doubt, largely increased the godliness of deportment and improved the odor of sanctity in these reverend gentlemen.

By all odds the most distinguished churchman of colonial times, in Virginia, was James Blair, Rector of Bruton Parish, from 1710 to 1743. He was the founder and first president of William and Mary College, and Commissary to the Bishop of London. His parish of Williamsburg, or Middle Plantation, was reported to the Bishop of London, in 1723, as ten miles square. His ministry "commenced," says Meade, "under the administration of Governor Spotswood, and with a tender from the Governor to the vestry of aid in building a new church, the plan of which was sent by him, and is, I presume, the same with that now standing. Its dimensions were to be twenty-two feet, with two wings, making it a cross as to form. The Governor offered to build twenty-two feet of the length himself."

Blair was the most energetic of men, and always foremost in the affairs of Church and State. He kept up an endless warfare against the royal governors in matters relating mainly to the church, and he defeated them in succession and single-handed. Even the genial and cultivated Alexander Spotswood, that distinguished soldier and most accomplished gentleman, did not long live in amity with the staunch and invincible old polemic, and, as the Governor himself admits, it was not the parson who was worsted.

Blair's quarrel with Sir Edmund Andros was a famous one, and he fairly drove the successor of Andros, Sir Francis Nicholson, from the colony.

Bruton Church is really very beautiful. The gable on the east end is densely covered in ivy, and the suns and storms of many years have so mellowed and harmonized the whole that one is incapable of criticising the church in detail. No doubt it is, after all, but an indifferent affair, as our friend, the Archdeacon Burnaby, insists, but the softened, warm, yellowish-red tone of the old bricks, the simple dignity in the lines of the building and the fair proportions of the old bell-tower, the clinging ivy, the background of fine old trees, of grassy yard and mouldering mossy tombs, all so eloquent in the tender loveliness of age, unite in a picture which has in it a good bit of old England, and is full of quiet charm. The tin roof which replaced the ancient shingles was an unhappy mistake, and we may hope that the better taste which now controls the parish will, some day, restore the nobler covering. Going in through one of the wrought-iron gates set in the low wall of brick which surrounds the churchyard, one wanders among the tombs in that subdued enjoyment of the solemn beauty of the place found only in an ancient

garden of the dead. Here are some quaint old stones, rich in sculptured heraldic device, and bearing, in graceful, antique letter, stately tribute to the deeds and virtues of the sleepers beneath.

Here, under a twisted mulberry in the southeast sunny angle of the wall, lies "Barradall, armiger," beneath a tomb blackened and seamed with age, but very good in design, and bearing a splendid sculptured crest and a Latin eulogy of that worthy jurist of the colony, upon the flat top stone. And not far from the tower, at the western end of the church, among a group of the larger tombs, is the very noticeably handsome monument erected by a grateful colony to the memory of Edward Nott, late their Governor, "a lover of mankind and bountiful to his friends," who died August 28, 1706, at the age of forty-nine. The lettering of this inscription is particularly good, and the armorial bearings carved above it are rich in scrolled foliation. At the head and foot and on the sides of the tomb are relievos in white marble carved by a well-skilled hand. These handsomely carved marbles were, of course, brought over from the mother country, the work being of much too fine a quality to have been executed in the colony. Edward Nott was the first deputy of the Earl of Orkney, who was made Titular-Governor of Virginia, in 1704, but never came out to his province. Nott's administration lasted only two years, and he died in office, having won the affection of the colony by his wise and beneficent government.

The large white marble monument of the Bray family, close by, is also very imposing. The larger tombs are being cleaned and restored in a very satisfactory and intelligent way under the auspices

of the lady parishioners of Bruton. Those of Nott and Bray have been lifted out of the ground into which they had partially sunk, and their carvings have been cleaned so as to reveal the beauty of the work, without, however, losing the inimitable mellow tones with which old time has glorified them.

In another part of the yard, lying half-hid among the long grass, is a plain gray slab of stone setting forth in eloquent simplicity that "Here lyes the corps of Hugh Orr, hammerman in Williamsburg — 1764" — and many graves there are unmarked by stone or mound, most eloquent, perhaps, of all.

The interior of Bruton has little to reward the eye of the curious. There is, to be sure, the alleged, and doubtless perfectly authentic, Pocahontas font, in which they baptized the wild princess after they had talked her into becoming a Christian, and the wife of John Rolfe. There is, also, some interesting communion-plate belonging to Bruton parish: the Jamestown service, presented by one Morrison to the old Jamestown Church, is of heavy silver, rather crudely fashioned, and probably made in Jamestown, where there were capable artificers, sent out among the original companies. The "Queen Anne" service is of gold, and richly chased with the arms of Beauchamp, and of another family. The work is said to have been done by Harache, a French *emigré*, who had been in the employ of the great Marlborough. The third, a heavy silver-service, was presented to Christ Church, Bruton parish, by George the III; it bears the royal arms handsomely chased on flagon, chalice and paten, and is delicately wrought upon the edges with a shell design. Drawings of these sacred vessels may be seen in Buck's "*Old Plate.*" Architecturally, the interior of the church contains very little of interest. It is, however, rich in historical associations, and the imagination easily peoples the old place with the phantoms of departed greatness.

Up there, in the gallery, sat the "quality," in the older time, when they came in their great state-coaches to church from their plantations on the York or the James. From Rosewell, over on the York, came the great Page family, the descendants of Colonel John Page, who, as we have seen, was one of the original patrons of Bruton. At their splendid house of Rosewell, and on their neighboring estate of Shelly, the Pages lived like the grand seigneurs they were. The old Indian name of Shelly was Weromocomoco, and it was here that grim, old Powhatan set up his court, and feasted in royal state upon the luscious oysters of the York. The Pages were great churchmen, and staunch upholders of the Establishment. Their estates were of vast extent, and Matthew Page, adding to them the great adjoining tract of Timber Neck, in 1690, by his marriage with Mary Mann, broadened the family acres into a princely domain. Mann Page, his son, built Rosewell-house, in 1725, having brought the bulk of the material from England, as was usual in that time. Rosewell is ninety feet square, an imposing pile, and the interior was finished in all the elegance of wainscoted walls, mahogany stairs and carved mantels.

The building of these splendid and costly manor-houses in the infant colony, as yet hardly more than the unreclaimed wilderness, was a curious instance of the ostentatious grandeur of the period, exaggerated as it was among these lordly planters of Virginia who emulated the pride and luxury of their English prototypes.

Despite the wildness of the life they led, their society was distinguished for courtliness of manners and for a boundless hospitality, the traditions of which is still an active principle in the households of their descendants.

Educational facilities were very limited in the colony. The sons of the richer families were sent to William and Mary, or to England. Outside of these two resources there was nothing. But, after all, they picked up somehow enough learning to fit them for the management of their great plantations, to look after the growth and final sale of the great staple, the tobacco-crop, and to direct the training of their negroes in the trades and avocations of varied kinds exercised upon the larger places, to see to the importation of the household necessities and luxuries from England, and, above all, to acquit themselves gallantly at race and rout, in the parlor or the woodland camp. To the personal beauty of the women who graced their homes canvases by many a famous hand bear witness, and that they practised all the domestic virtues in a high degree in the midst of the reckless living, the prodigal hospitality and wild profusion of the times, we have, also, the amplest testimony. Then, as now, the reputable wayfarer in the Old Dominion found every door open to him, and warm-hearted entertainers eager to house and feed and help him on his journey. The taverns were small, comfortless grog-shops. The plantations were isolated, and, as there were few roads worthy the name, communication between them was mainly by the rivers upon which all the great places were located. As the country became more settled and roads were opened, the planters went in for fine horses, and set up their studs of hunters and racers, often bred from famous imported stallions of great value. Their equipages were of great splendor. General Spottswood, living in retirement at Yorktown, advertises in the Virginia *Gazette*, in 1737, to sell his "coach, chariot, chaise and coach-horses," and "one of the best-made, handsomest and easiest chariots in London." And so the great people rode in state in their family-coaches to church, with pomp of sleek-coated, prancing coach-horses and splendor of glittering crested panels.

And, standing here in the warm sunshine in the doorway of the ancient house *of* God, we may fancy the Rosewell coach reined up at the gates, and discharging its aristocratic burden of satin-robed beauties and brave gentlemen on a bright May morning in the later colonial times; and we may see young Mr. Jefferson, at present an undergraduate of old William and Mary, stepping down, to hand out with graceful empressment, the lovely mistress Rebecca Burwell, whom he adores just now, and who had the distinguished honor of refusing the embryo statesman's heart and hand somewhat later. We will picture Mr. Jefferson to our imagination as a rather slim and callow youth, at this time, with curling locks of rufous gold, debonnair, and of courtly manner. With him is his friend, John Page, of Rosewell, his chum at William and Mary, and the fellow-patriot with whom he listened to the denunciatory thunderings of Henry in the House of Burgesses, and sweet Anne Randolph, and his friend, Ben Harrison. As they enter the old church, wherein their ancestors have worshipped for generations, and, with rustling of skirts, preening of feathers and smoothing of rumpled laces, march to their seats among the aristocrats in the gallery, the admiring commoners look on from their places on the floor below.

Williamsburg was always the great centre of fashion in the old colony times. The "season" lasted during the session of the House of Burgesses and the Supreme Court, and when the time arrived for the meeting of those august bodies, every considerable planter in the country roundabout bundled his family into the great state coach-and-six, and drove up to the Capital for a few weeks of brilliant gayety.

The Royal Governors and other officers of the Crown vied with one another, and with the citizens, in the splendor and luxury of their dinners and balls. There were horse-races and many other sports, and gambling ever fast and furious, and now and then, at dawn of day, there was the gleam of crossing swords or the flash in the pan of a duelling-pistol out behind the town, on a sequestered bit of turf beneath the trees, where hot-blooded gentlemen settled the undetermined issues of the night, of love or play. There was feasting and dancing at the Raleigh Tavern, and the plays of Shakespeare and Congreve were given by the "Virginia Company," from London; and thus pleasantly did the life of the old capital roll on up to the sterner times of the Revolution.

But, whatever wild gayety and riotous dissipations may have filled the week, old Christ Church of Bruton received them within her venerable walls when the Sabbath came round, and with becoming decorum these aristocratic squires and dames and beaux and belles, of the younger England, listened to the word of God in the old fane of their forefathers.

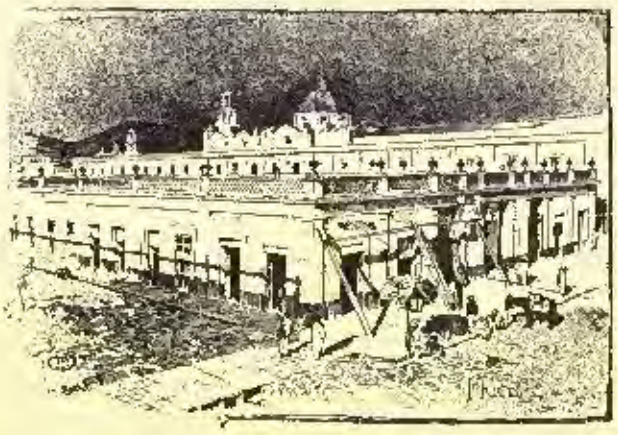
A. B. BIBB.

(To be continued.

PUGET INLET TIMBER BELT. — A lumber pile made of boards each 100 feet long and 6 feet in width would be an unprecedented sight in the East, but a gentleman recently returned from a visit to the coast of the North Pacific Ocean, says, that piles of lumber such as that are common at the mills on Puget Sound. "Boards 100 feet long and 6 feet wide, without a knot in them," he said, "are common cuts from the gigantic fir trees of the Puget Sound forests. These trees grow to the enormous height of 250 feet, and the forests are so vast that although the saw-mills have been ripping 500,000,000 feet of lumber out of them every year for ten years, the spaces made by these tremendous inroads seem no more than garden patches. Puget Sound has 1,800 miles of shore-line, and all along this line, and extending thence on both sides miles and miles further than the eye can see, is one vast and almost unbroken forest of these enormous trees. There is nothing like it anywhere on the Pacific coast. An official estimate places the amount of standing timber in that area at 500,000,000,000 feet, or a thousand years' supply, even at the enormous rate the timber is now being felled and sawed. The timber belt covers 30,000,000 acres of Washington Territory, an area equal to the States of Vermont, Massachusetts, Connecticut and New Hampshire. The markets for the Puget Sound lumber are entirely foreign, being South America, Australia, Central America, and the Pacific Ocean islands." — *Philadelphia Item.*

AUTUMN JOURNEYS IN MEXICO[1]—V.

TO TOLUCA AND BEYOND.

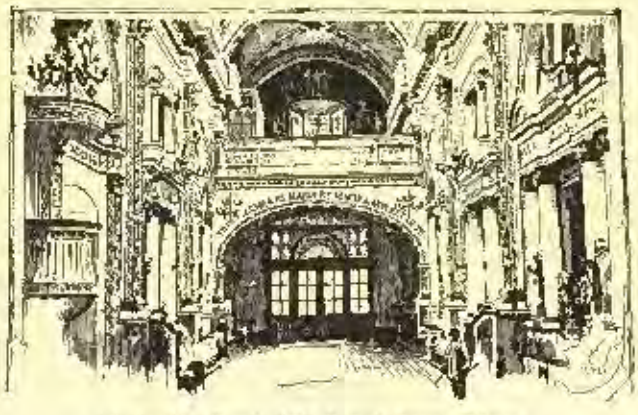


Plaza del Mercado, Toluca, Mex.

OCCASIONALLY one meets in Mexico wouldbe sightseers who feel aggrieved that Mexican towns should be old and somewhat out of repair, upon whom the picturesqueness belonging to age and historic association is lost, and who express themselves as though disappointed at not finding the City of Mexico fresh from the hands of a modern architect. What preconceived ideas of Mexico they had, or what led them to journey towards that country it would be difficult to guess, but being there they might find in Toluca that newness and freshness which would in part atone for their disappointment over the age and decay of some of the other towns. For only a few years ago the Toluceños developed a fondness for rebuilding and modernizing and the result has been the remodelling of all their public buildings and that has stimulated the possessors of private buildings to fall into line, and now Toluca presents the appearance of a new city. It is the capital of the State of Mexico, and no better sign of the prosperity of that State can be found than in the comeliness of the buildings in which the officers of State transact their business.

Glaring discrepancies, startling contrasts, annoying incoherencies are very apt to occur where this process of rebuilding, in part, an old city goes on. But the architects of Toluca were wise in their generation and have avoided all such perils. When they set out to replace the severe and monotonous fronts, which are characteristic of Mexican architecture, with newer and more ornate styles, they sought their models not in the English of two and three centuries ago, not in the French, with its mansard roofs, not in the Russian, long, cold-winter style of architecture — but in Greece.

The result is most pleasing. The buildings retain their former arrangement which was adapted to the requirements of the climate,



Interior of the Church of Our Lady of Carmen, Toluca.

the chief feature of which is the *patio* or open court, and the Roman arch is extensively used. In one case, however, a Grecian temple has served as a model for a building. It is the Municipal School near the Church of Our Lady of Carmen. It is a perfect little gem of architecture, save that it occupies a site below the level of the street upon which it fronts. A little filling-in of the lot (it stands a hundred feet or so back from the street), would have made it the most satisfactory building of its kind in Mexico. The new market is an exception to the prevailing style of architecture in the new Toluca: it is Pompeian, the interior painting especially. It is beautifully neat and clean, a great rarity in Mexican markets, and is worth a visit. But Toluca is a remarkably clean city throughout. It has a good natural drainage and its streets are so constructed as to allow the water to run off without obstruction.

But it must not be supposed that in their efforts to renew the Toluceños have lost all reverence for antiquity. Not so. Witness many a quaint bit of old architecture to be seen in and about the city. Witness more particularly a passageway leading from a street to the parish church of San Francisco, not at all conforming to the plan of that church as it now stands, but nevertheless preserved, as we are informed by an inscription upon one of three archways therein, that they may remain as relics of the first Catholic temple ever erected in Toluca. Among the new public buildings in the centre of the city are the foundation walls of what is to be a large and magnificent church. It is more than fifteen years since the work was begun. Elsewhere in Mexico there are scarcely any churches in process of creation, and only of late years have any been restored. It may be significant of the enjoyment on the part of the Romish Church in the State of Mexico of immunity from the oppressive attitude which the Government has assumed towards the Church elsewhere. Toluca is not especially a city of churches as most Mexican cities are, but the few churches which the city possesses are worth visiting and contain some good paintings. The Church of Nuestra Señora del Carmen, has a rococo interior, but its chief interest lies in its curious old furniture, and its small organ which is probably the first organ made on this continent.

Toluca is situated in a valley of the same name, over eight thousand six hundred feet above the sea-level and dominated by the extinct volcano, Nevada de Toluca. Only one city in the Republic is of greater altitude. Its population is about fifteen thousand. It is reached by the Mexican National Railway from the City of Mexico, distant about forty-five miles. The railway has recently become a highway between the cities of the United States and the Mexican capital.

The journey up from the City of Mexico is delightful. Leaving the valley of Mexico the road enters the mountains on the west and winds around among them in making its ascent to Cima, which is exactly ten thousand feet above the level of the sea. Thence the road gradually descends but in the same circuitous manner, affording magnificent views all along of maguey plantations, picturesque villages, and wild mountain gorges. The train runs along the side of the mountain directly over Ocoyoacan, so that the passenger may obtain a bird's-eye view of that curious town.

Beyond Toluca the Mexican National continues its way to other interesting cities, and through a country where the retention of Indian names, such as Tlalpujahua, Tepetongo, Chapatuato and Zintzuntzan, attest that the native races still exist there. This region was the seat of the Mattatzinca Indians before the advent of the Aztecs. Morelia, two hundred and twenty miles from the City of Mexico, is the beautiful capital of the State of Michuacan. Being too far off from the City of Mexico to have suffered very much from the violent "reform" of 1860, or to be influenced by the anti-Catholic tendencies of the leading men of the Mexican metropolis, Morelia remains a stronghold of Romanism. Its claims upon the attention of the historian are based upon its having furnished birthplaces for two of Mexico's revolutionary heroes, Iturbide and Morelos, and a suitable place for the execution of the patriot Matamoros, in 1814. As evidence that republics are not always ungrateful, the house in which Morelos first saw the light and that in which he lived for a time, are each marked with a suitably inscribed tablet; and it was to perpetuate his memory that the name of the city was changed in 1828 from Valladolid to Morelia. The cathedral in Morelia, in the style of the Spanish Renaissance, occupying an entire block, is well worth seeing. Its interior decorations of carved wood, Mexican onyx and some silver are especially interesting.

Still farther off toward the northern terminus of the Mexican National is the town of San Miguel Allende, interesting in many particulars, but principally on account of its recently restored church. It is the only approach to the Gothic, so far as I know, in Mexico. The strangest thing about it is that the restoration was the work of a native of San Miguel who had no architectural training whatever, and traced all of his working-drawings upon the ground where his masons were at work. The only comment to be made upon his success in such an undertaking is, that it is greater than would naturally be expected.

ARTHUR HOWARD NOLL.

(To be continued.)

[1] Continued from No. 679, page 294.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

CHRIST CHURCH, BRUTON PARISH, WILLIAMSBURG, VA.

[Gelatine Print, issued only with the Imperial Edition.]

See article on "Old Colonial Work in Virginia and Maryland," elsewhere in this issue.

MINERS' HOSPITAL, HAZLETON, PA., MR. BENJAMIN LINFOOT, ARCHITECT, PHILADELPHIA, PA.

THIS is a State Institution for accident cases only and comprises a central administration building, running north and south, and two large general or so-called "open wards" connecting with the same

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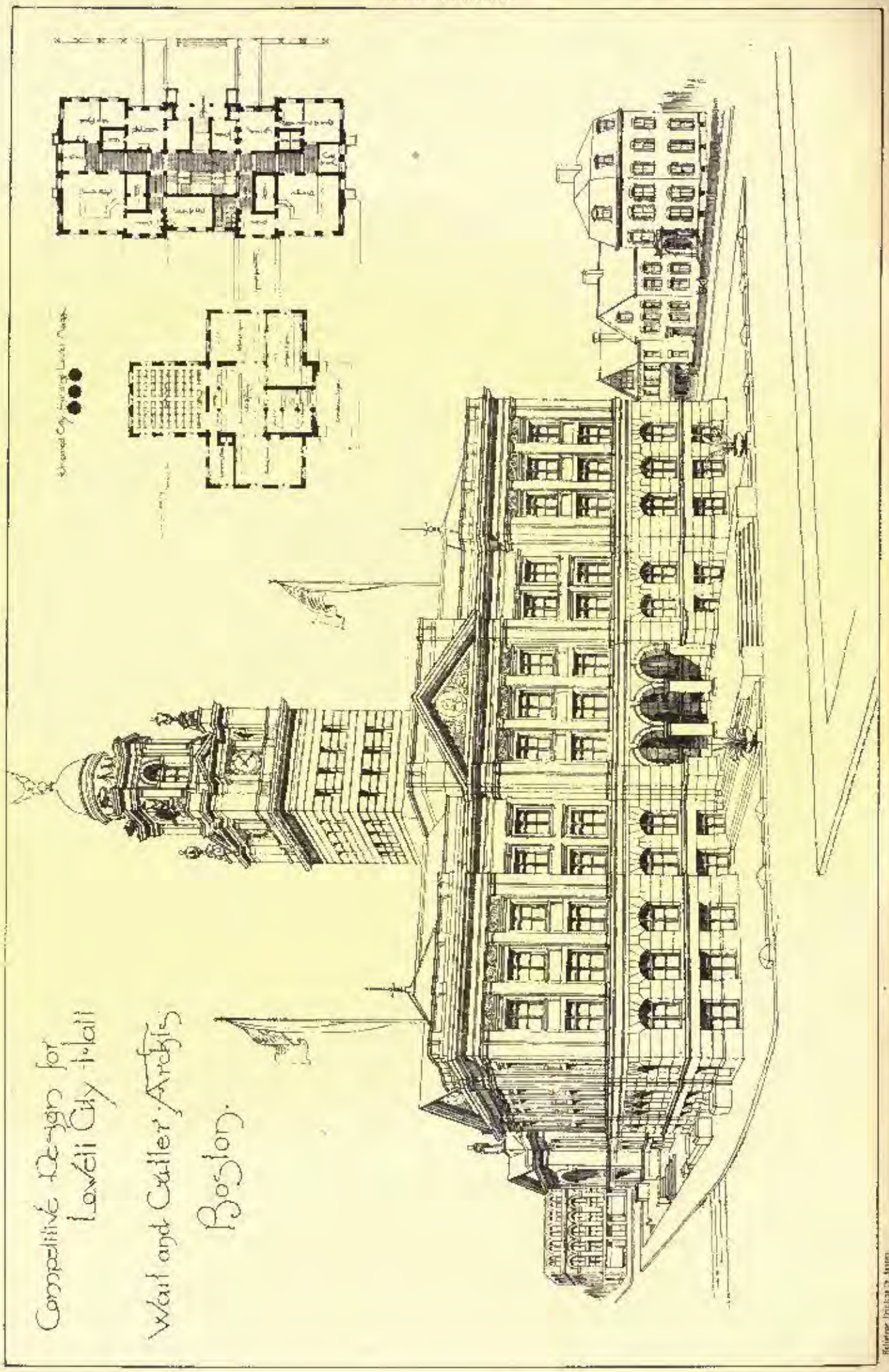

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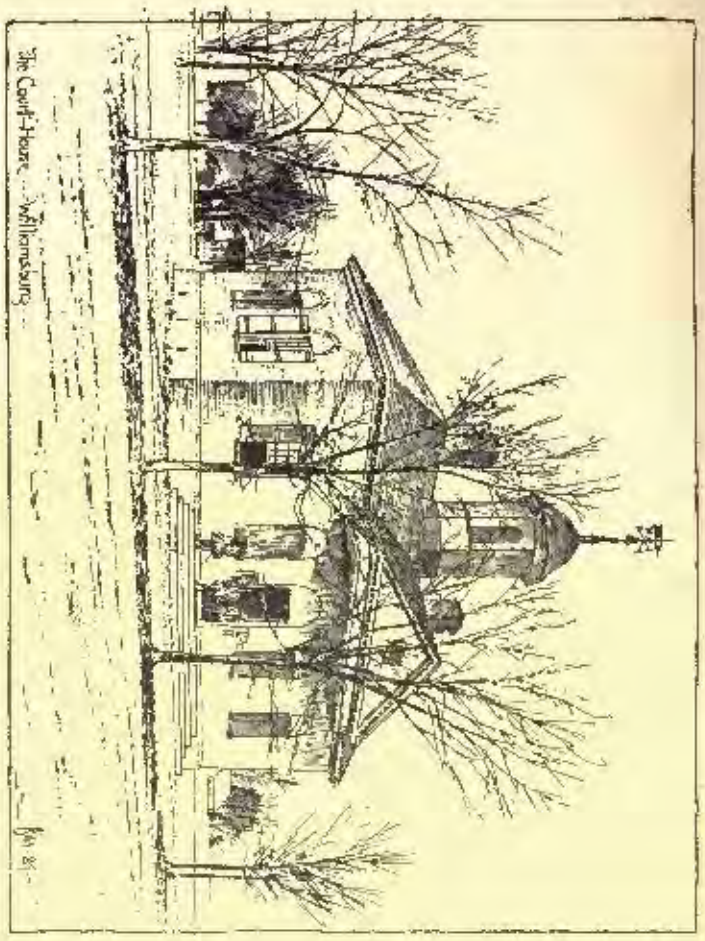

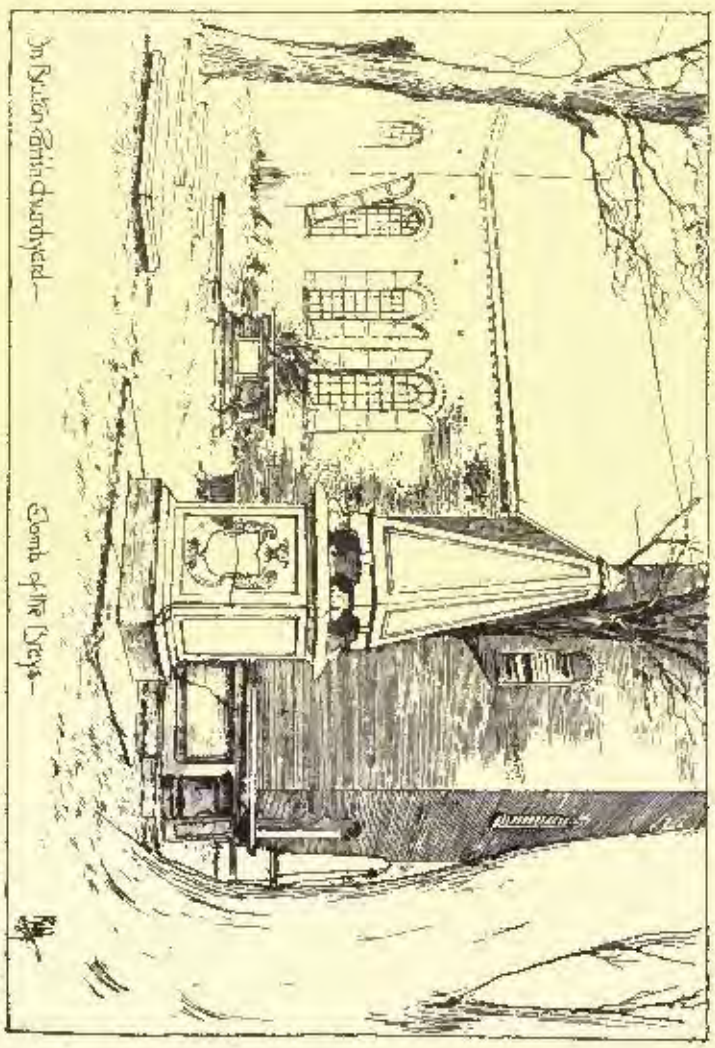

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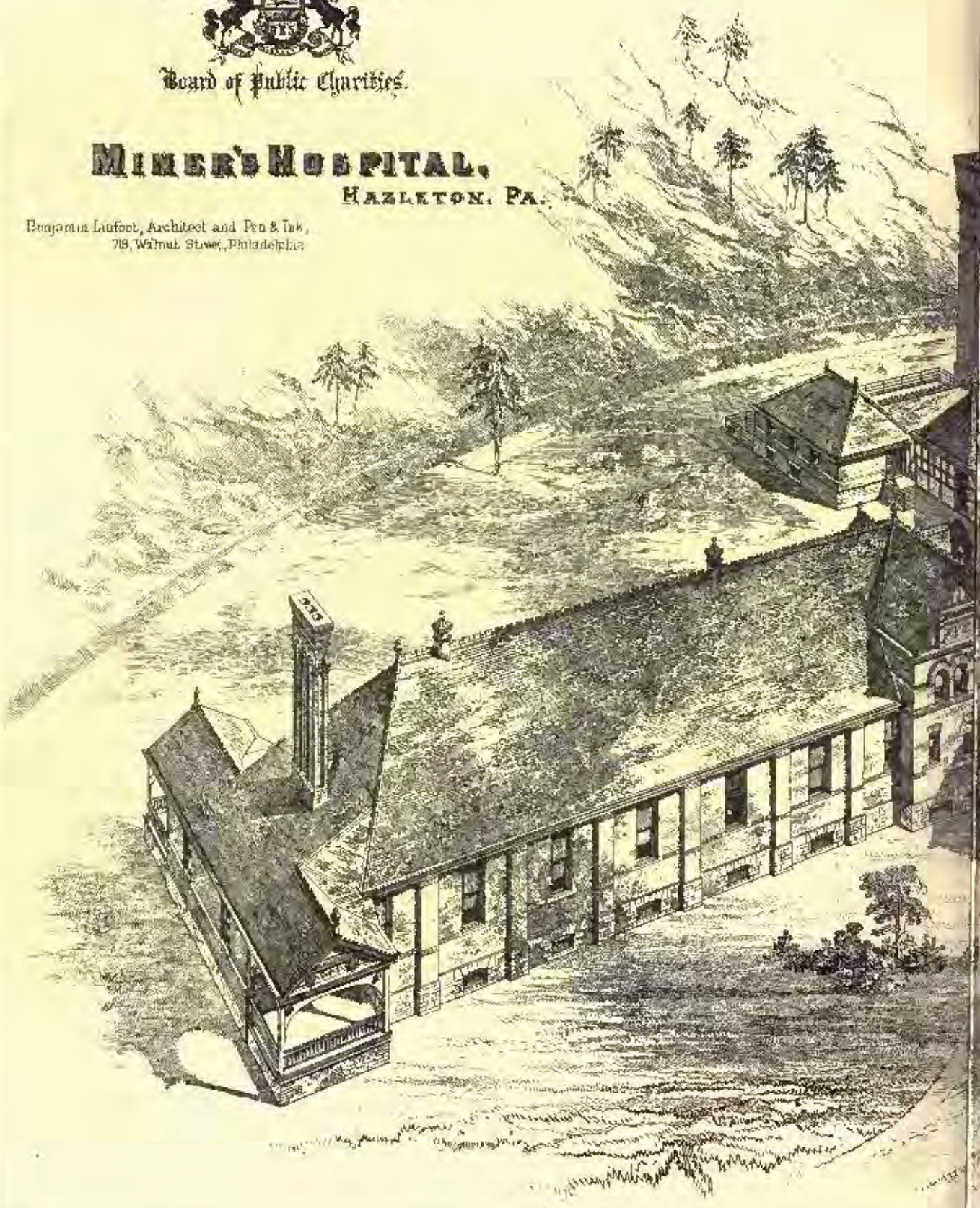
Commonwealth of Pennsylvania.

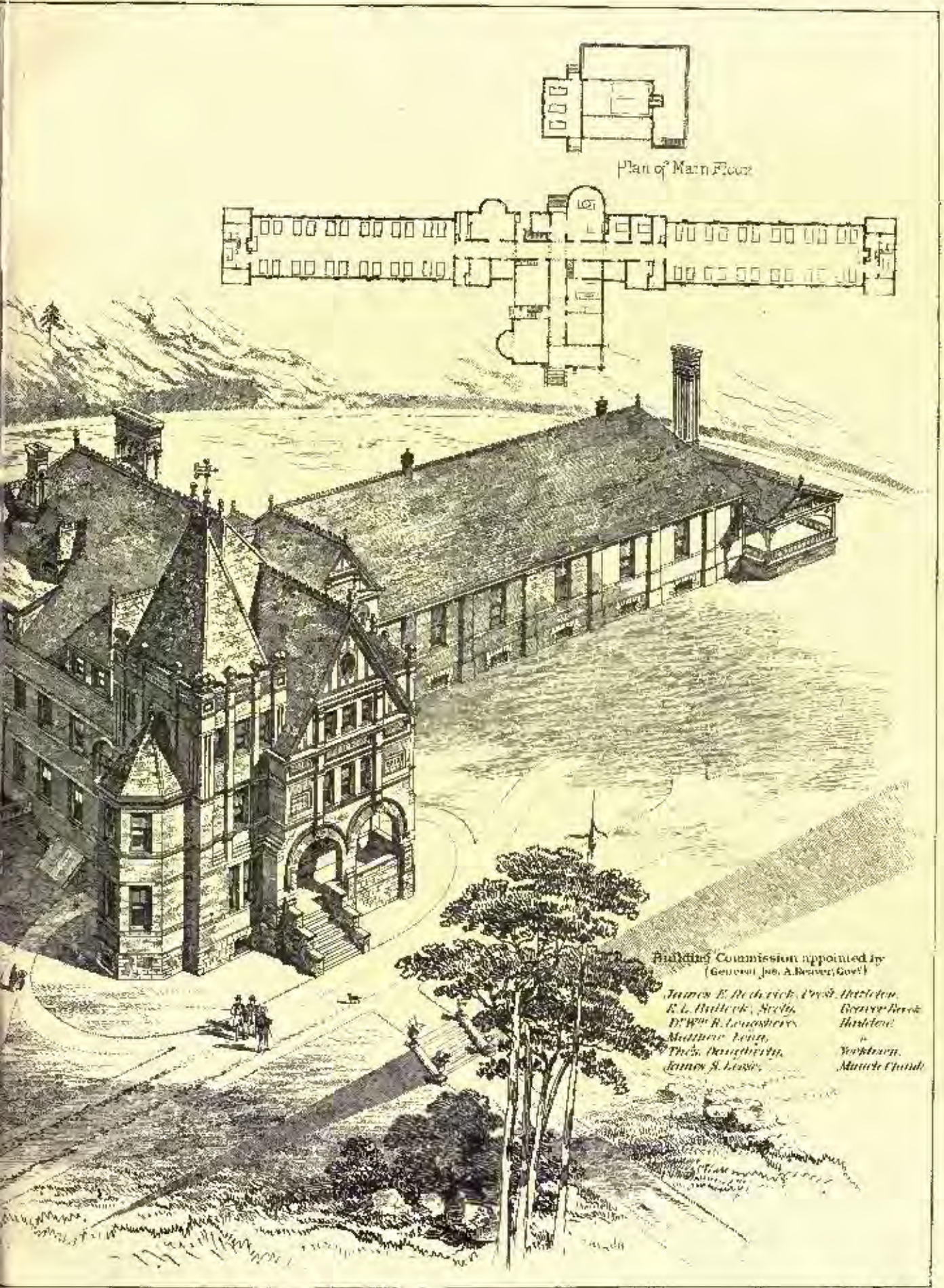
Board of Public Charities.

MINER'S HOSPITAL,

HAZLETON, PA.

Benjamin Linfoot, Architect and Pen & Ink,
718, Walnut Street, Philadelphia





Kellogg Printing & Binding

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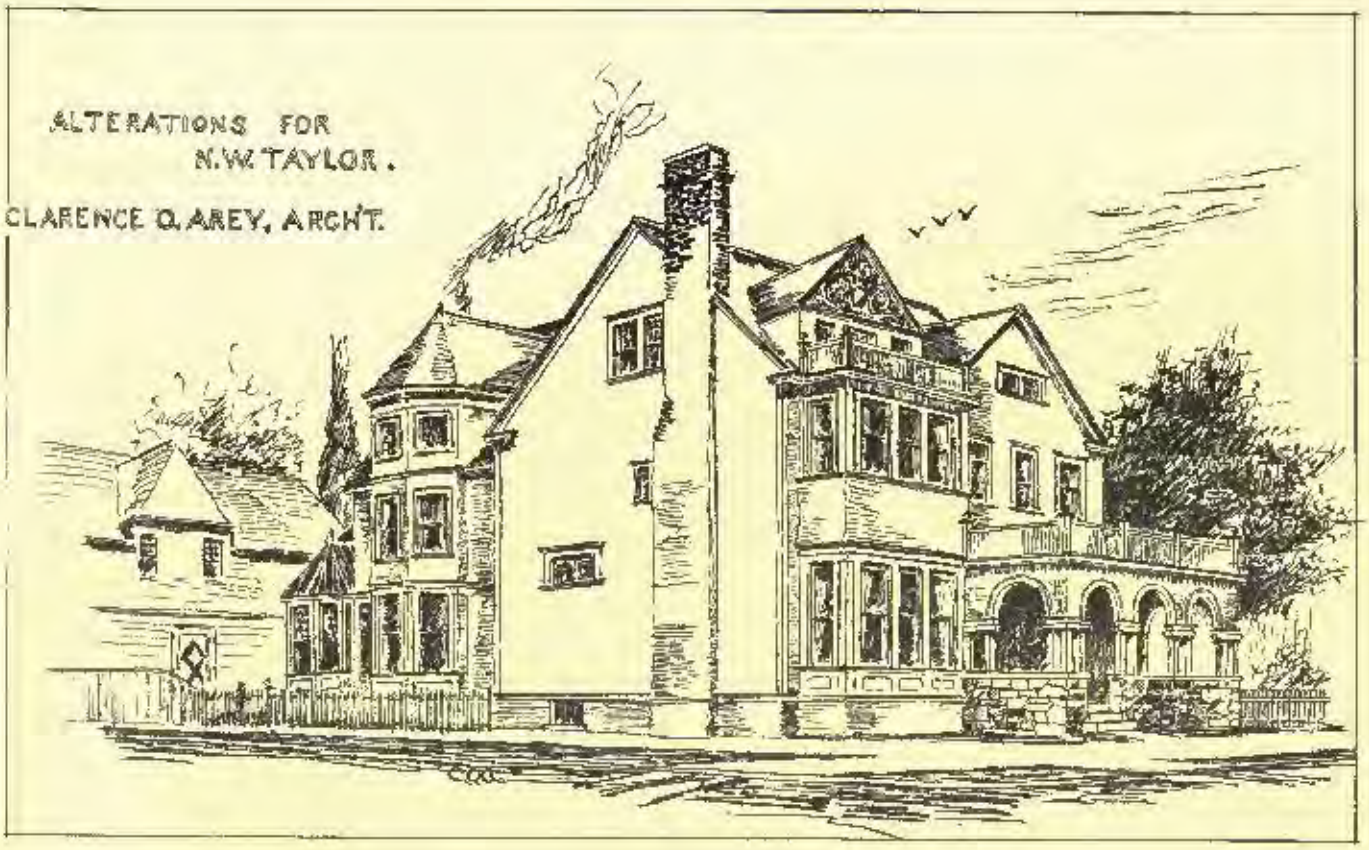

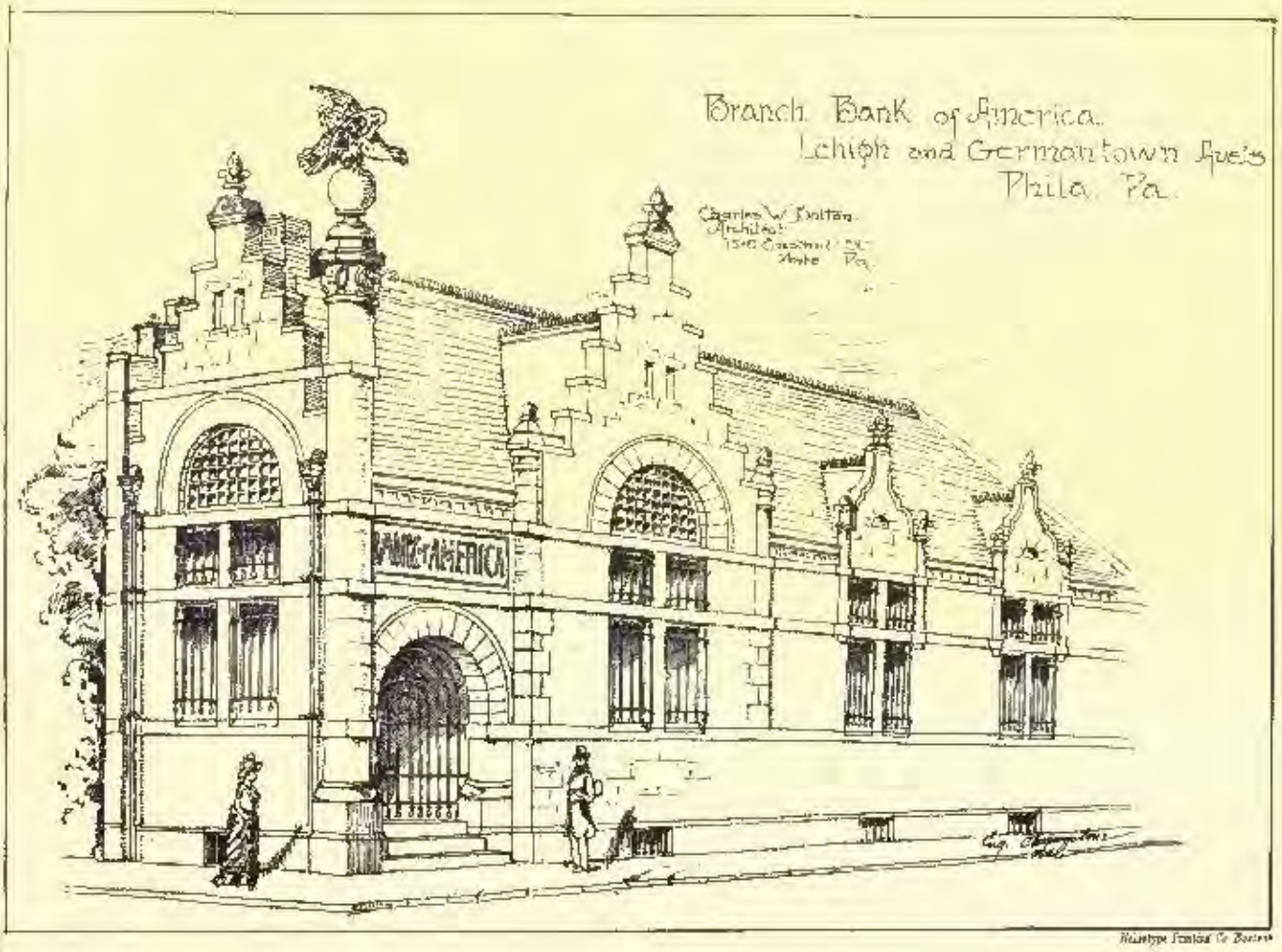

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PART OF THE DOOR.

A. RODIN, SCULPTOR.

MME. MORIA.

Heliotype Printing Co. Boston

and running east and west. The administration building contains on the first floor to the right of the entrance a patients' reception-room and the apothecaries' office and bedroom, the apothecaries' office being connected by a private stairway with the basement, where the bulky supplies for bandages and other purposes will be kept. To the left of the entrance is the board-room. The bay alcove leading from the same will be occupied by the superintendent's desk. Next to the board-room comes a private stairway, leading to the resident faculty's apartments in the second story and the patients' dining-room, with a pair of dumb-waiters connecting it with the kitchen and pantries in the second story. Back and to the right of the cross hall is the receiving and operating room and to the left the kitchen entrance and stairway, hoist and conveniences for the working staff. In the cross halls connecting the wards with the central building are located the patients' sitting-room on the one side and a pair of isolated wards on the other, the remaining space being devoted to nurses' rooms, linen-rooms, patients' wardrobes and dirty-linen shutes, these latter connecting with the basement. In the extreme ends of the large wards are situated the patients' baths, wash-rooms, water-closets and two glass-inclosed porches to be used in the winter as sun-parlors. The second floor front is to be occupied by the resident physicians, and comprises a sitting and bed room for each and a dining-room common to both suites of rooms; a coroner's-jury room and the back portion of the floor to the kitchen, scullery, pantries, store-room and servants' dining-room. The third floor is devoted entirely to the help, the front portion to bedrooms and the back to the laundry. The boilers are contained in a separate building in the rear of the main structure, but connected with the same by means of a duct underground all walled up and arched over. This annex also contains the dead-house and the place for holding autopsies.

All the internal constructional walls are of brick and the stairways of iron, the exterior foundation walls up to the water-table all being built of local stone and the superstructure will be of brick and terra-cotta, relieved with Indian limestone heads and sills and bands of Cleveland buff brick. The roof will be covered with the best Lehigh slate, the ridges covered with terra-cotta cresting and the tower with galvanized-iron and copper finials.

The floor area of the open wards is 2,430 feet, or 101 square feet to each bed, and the wards being 18 feet high, the patients have each 1,401 cubic feet of air. In the isolated wards the quota will be a little in excess of the above figures.

The heating and ventilation will be accomplished by means of two Blackman disc-fans, one for driving the heated air into, and the other for exhausting the vitiated air out of the various wards and other apartments. These fans will be driven night and day, winter and summer, in the latter instances of course forcing and changing the air at the outside normal temperature. The plant is designed to be capable of changing the entire atmosphere in all the first-story rooms and wards once in every twenty minutes and all the second and third story rooms once in every thirty minutes and in zero weather to maintain a steady and continuous heat throughout the interior of the building of seventy degrees Fahrenheit.

The steam power will be furnished by two thirty horse-power horizontal tubular boilers, one for supplying the heat and the other for operating the engines, driving the fans and laundry-machinery and also the pumps. One of the latter will be a Deane double-acting fire-pump, with ten-inch cylinder, three-inch suction and two-inch discharge. This is to be arranged for filling the tank in the fourth story for supplying the building with water and also for sprinkling the lawns and, should the emergency arise, for fire purposes.

The laundry will have a complete outfit of rotary washers, centrifugal dryer, starch digester, blue-tubs, drying-room, French mangle, etc.

The total accommodation is fifty beds (all males) and the cost $60,000 or $1,200 per bed without furniture.

SKETCHES AT WILLIAMSBURG, VA., BY MR. A. B. DIRR, ARCHITECT, WASHINGTON, D. C.

See article on "Old Colonial Work in Virginia and Maryland," elsewhere in this issue.

BUST OF MME. MORLA. PORTION OF THE DOOR FOR THE MUSEUM OF DECORATIVE ART. AUGUSTE RODIN, SCULPTOR.

BRANCH BANK OF AMERICA, PHILADELPHIA, PA. MR. CHARLES W. BOLTON, ARCHITECT, PHILADELPHIA, PA.

ALTERATIONS FOR S. W. TAYLOR, ESQ., CLEVELAND, O. MR. CLARENCE O. AREY, ARCHITECT, CLEVELAND, O.

COMPETITIVE DESIGN FOR CITY-HALL AND LIBRARY, LOWELL, MASS. MESSRS. WAIT & CUTTER, ARCHITECTS, BOSTON, MASS.

AUGUSTE RODIN.[1]—X.

[The following comments on Rodin were furnished the writer by one of the ablest of the younger French sculptors.]

Female Satyrs. Upper Right-hand Corner of Door. Auguste Rodin, Sculptor.

"RODIN'S life, since he came to Paris, in 1877, is an old story in the history of French art, but none the less interesting because it has been so often told. Every forcible, original and living artist, from Delacroix down, has had the same obstacles to contend against. They are in human nature. It is the way things go.

"'The Age of Brass,' when it appeared in the *Salon* of 1877, was such an astounding piece of modelling even to the best sculptors, that we were all completely taken off our feet. Those who could not explain its existence by the ordinary process of making sculpture, were obliged, in spite of themselves, to say that it must be a cast from nature, a trick by no means rare in these days. I don't think that the men who made this accusation against Rodin, really knew or thought at the time what they were saying, or were conscious of the gravity of the charge. They had to say something. No one thinks so now. The appearance of this statue, and that of its immediate successor, 'The St. John,' was the loudest clap of art-thunder that has been heard in France for a hundred years. Usually it takes about fifty years, in France, for a real work of art to get a hearing. Such statues are too much for the general average of artists, and those who occupy themselves with art.

"It is curious to observe that but very few of the historical writers on art have said anything about Rodin. He must die first. Rodin came by an unauthorized route. He is not a graduate of the School, and his work must first be hated. Every master and every real masterpiece that we have got in Paris has passed through the same experience. When Rude's great bas-relief on the Arch of Triumph was first shown to the public, it was universally condemned, and so was his statue of Marshal Ney, more especially by the sculptors of the School. The same was true of Carpeaux's groups on the Tuileries, and if Lefuel, the architect, had had his way, they would have been taken down. Carpeaux went to the Emperor and complained against Lefuel's intentions, and the result was that they were preserved. The sculptor's group on the Opéra was generally condemned, and even the architect did not like it. It took seven years, and the death of the sculptor, before his group of the 'Four Quarters of the World,' for the fountain of the Luxembourg Garden, was accepted by the city. Frémiet's equestrian 'Joan of Arc' had no more bitter opponents than the artists of Paris. So bitter that they talked of petitioning the Common Council to take it down.

"Great art in France has had a strange history, especially in modern times. All of her strongest men have been more or less martyrs to her voluntary neglect, instead of children of her care. Barye, Corot, Millet, Rousseau and many others are examples. Those men owe nothing to their country. Courbet, the greatest painter of modern times, was persecuted like a criminal, and driven to exile and death by his own country's government. A mighty spirit, who, though going out in disgrace, left a wake of glory behind him for future ages to glorify.

"Barye received the accustomed marks of distinction from art authorities, but they neglected to encourage his genius. The personality of Barye, as shown in his works, was repellant to all prevailing art interests, and the principles upon which those works are made are almost wholly ignored.

"It was a personal, not a national influence that recognized Rodin. A few artists saw his merits and had the courage to extol them. It needed an unusual independence on the part of Turquet to have anything to do with Rodin, as he ran the risk of offending all of our art authorities. Turquet was an independent in art matters, and acted for the interests of the best art. He did an immense deal of good; was a valiant friend of Rodin, and deserves all praise. The *Salon* jury would only give Rodin a third class medal, while he ought to have had the Medal of Honor when he exhibited 'The Age of Brass' and 'The St. John.' But Turquet bought the statues all the same. It is perhaps not too much to say that Turquet created Rodin. The commission for the door is the most important one of this century. Rodin made himself. His life has been a very hard one. I know by experience what it is to work for commercial sculptors. Nothing is more menial for a proud, sensitive, independent and simple nature. Rodin is all that, besides being a great artist. These sculptors are a rough set, and I can't imagine anything worse than for a man who had made, or was capable of making, a figure like 'The Age of Brass,' to be obliged to earn his bread by working for such employers. Yet Rodin was not alone. Barye, who made the finest piece of modelling in French sculpture, worked for commercial sculptors all his life. I remember when Rodin had only fourteen cents with which to get a meal. But

[1] All rights reserved. Continued from page 265, No. 701.

it is in this way that much of the greatest French art has been produced. Belleuse was the most capable of Rodin's employers, but he had no idea of the latter's ability. During the contest over 'The Age of Brass,' in 1877, and while Rodin was working for him, he not only neither expressed any interest or sympathy for Rodin, but said, when asked what kind of a fellow Rodin was, 'Oh, he is a good workman, but he copies anything and everything that he happens to see.' After Belleuse saw that Rodin was making friends, he got him to work at Sèvres, and asked Rodin to make his bust, which Rodin did, and gave it to him. But even while doing that his way of working did not please Belleuse, and the latter used to exclaim in half-indignation, 'Sacred name of Rodin, he has worked for me for ten years, and I have not been able to print myself upon him. He will never be able to model as I want him to.' Besides the annoyances of working for ignorant employers, there is the degrading influence of bad methods. How Rodin lived through it all, and escaped its demoralization is indeed a wonder. That he did proves him to be possessed of immense individuality, and a tenacity of purpose unsurpassed. The best half of his life was passed under these conditions. Night and Sunday work saved him from artistic and intellectual ruin. And all this for the sake of art.

"Barye and Fremiet were both more fortunate, for they got clear of this servitude much sooner.

"France is deservedly renowned in art, not by reason of a general art interest, but because of a few individuals. It is the same with Italy. The Renaissance represents centuries of Italian existence, yet it was made by a few men.

"France has never made her Delacroixs, Baryes, Millets, Rudes, Fremiets and Rodins. They have made her, and in spite of herself. They have made the sky of French art luminous — by suffering.

"What is sweeter than human sympathy. These men had to wring sympathy, courage and perseverance, out of misery, neglect and abuse. They seem to me more than mortal.

"The School would, of course, be Rodin's enemy; it was at the start, for he could not get into it. Seriously speaking, it can't be blamed, for no school or art organization can do much for personalities like his. It is beyond their scope. Each must look out for itself. Men like Barye, Millet, Rodin and others of similar nature, cannot be identified with any art organization, nor can the latter reach them. The purpose of a school of art, and all art societies, is to care for the average. They live, and are powerful for the day, but these men are forever. Schools are never sincere, sincerity is only with individuals. Genius has no worse enemy than those who assume to be learned. Neither are such men taught, either by schools or themselves; they observe, are inspired and grow. The growth and development of individuality is a personal matter. Our greatest men were not graduates of the School.

"Rodin has many enemies who say that his things are tortured shapes, without art, reason, logic or significance. The same has been said of all original minds. He is the only one of our sculptors who has a real understanding of the nude. His power of execution is prodigious. There is no one like him.

"The times, fortunately, have changed since forty years, more especially in regard to the writers on art. Then, there were but a very few who were not opposed to the great artists. Now, there are many who are on the look-out for, and are quick to recognize everything that is original, powerful and suggestive. As soon as they found Rodin, they supported him, and did not hesitate to proclaim his surpassing merits, as well as to protest against the injustice done him by the jury of the *Salon*. The press are decidedly in Rodin's favor. Roger Marx and others long ago pronounced him the first statuary of his time, and they were right. It is to the credit of these writers that it is now very difficult for conventional influences to kill a real artist in Paris. If Millet had lived in these days it would have been easier for him.

"We have never had a sculptor who is so intense as Rodin. Barye is often heavy, in spite of his power; perhaps, because of it. Carpeaux was sometimes careless in his impetuous rush for effect, and Fremiet, though the most distinguished mind in sculpture of modern times, and perhaps since many centuries, is sometimes almost dry.

"Do I think Rodin has had influence on the art of his country? Yes, a great influence, but in a quiet, though important way. He has already begun to cut a deeper mark upon his age than any other artist, and for these reasons: All the tendencies of his nature and work are natural and inspiring, just what all young and many old artists need, and have been long looking for. His work is nature, and that can be followed without fear or danger. It is the chief encouragement that students need, and it brings them the most joy in their studies. His work has an endless and safe attraction, a healthy stimulant.

"He was immediately felt and admired by the young artists and students at the School. He has a great many quiet followers. Barye, for one reason or another, did not touch the young. Neither does Fremiet. I don't speak of the School, for no great sculptors have come out of it. Great artists, like Barye, Fremiet, Chavannes and Millet, never have followers. They are landmarks to worship. Rodin is an exception. He has given an impetus, in the urging to a regard for individuality and the more serious study of nature, that no other of our artists has been able to give. He is very human and sympathetic, and free of all conventionalism. He is the only sculptor talked about by the students, and thought about by older men. He is an encourager to individuality.

"Not long ago I went to visit my old studio at the School, and the most important news the boys had to tell me was, that they had Rodin's old model. And this, years after he had got through with him.

"The audacious life and truth of Rodin's modelling has opened a good many eyes, of painters as well as sculptors. The fertility of his genius has been an inspiration to many.

"I said that his influence was quiet. It is so because the time has not yet come for those who are affected by him to speak openly in favor of such a revolutionary, nor to own allegiance to a force that is so antagonistic to the insipid conventionalism of the day. But they study nature harder than ever, and swear, in private, by Rodin.

"He has also a great many imitators, some of them men of ability, and although it is always a poor kind of art that is inspired or produced by the influence of any man, however great, deceiving only the ignorant, it shows that a new force is felt, and that some one is trying to improve on what he had previously done.

"If Rodin's influence is quiet, it is also slow, in a certain very significant sense. Slow, because, while his example is heartily acknowledged, his work is regarded, by many, as almost too strong and intense, and it will take a long time for it to be fully accepted. To any but very strong men his things are so great that they are demoralizing. The figures on the door are almost incredible. He is certainly one of the most varied and original sculptors in all art-history.

"After all, any serious consideration of French art-history must be made upon the basis of humanity, and not on that of nationality. The obstacles its artists have encountered, and the indifference and contumely they have suffered, must be set down to the discredit of common human nature, not to the imperfections of art organizations."

RODIN AS AN ARTIST.

The origin of "The Age of Brass," and "The St. John," show the simplest side of Rodin's art-nature, the figures on the door and the "Men of Calais" illustrate the intricate side, and reveal the full scope of his artistic and intellectual ability. The first, are the result of his earliest intimacy with nature, the last, of his capacity of analytical and synthetic examination, and his power of philosophical induction. In them is manifested the full round of his understanding, of the intricate relationship between the various emotions and their physical expression. They embody the complete programme of his loves and likes, in individual illustration and symbolism; and his feeling for geometrical arrangement, singly and in groups. Vivid as Rodin is in the artistic consideration of a subject, as especially shown in the figures on the door, his scientific leanings are now so strong that he works much from a geometrical point-of-view. Having become master of his art-instincts, he now ordains processes of working. He dreams, reflects, and organizes.

Rodin is original, without limit, clear and penetrating; generative and dramatic in his conceptive vision, delicate in sentiment, and rapid and powerful in execution. These qualities, pushed into activity by an unsurpassed intensity, have enabled him to produce a new world of sculpture. A new and strange one, a beautiful, fertile, and emotional world; startling, authorizing its own existence.

Rodin recognizes no filtered formula, however poetic or beautiful, he lives in the primitive domain of nature. The towering audacity of his personality is only equalled by his loyalty to what he has lived.

Not a decorative artist, like Michael Angelo, or Carpeaux, but more human than the first, and clearer than the last, the deepest seer of nature since Donatello. A terrible worker and a night-worker. Among rude men by day, at night a companion of the stars.

Reflecting no influence, and carrying the mark of no master. He corrected himself, and of himself became unconsciously possessed.

If it is necessary to class him, it would be among the Gothics.

With him, as with them, it is *life*, first and last.

He is an elemental force, a flow of new and reviving blood.

He has been called the Wagner of sculpture. If it is true that the great composer has exceeded all moderns in joining music to words in their highest relationship, then the comparison is just, for Rodin has knitted emotion and form together in equal intimacy. In this he has excelled all modern artists. By his knowledge of the human form he has gained the right to revel with the imagination in unrestrained liberty. He knows the sensibility of the nude, and adores it in all its details. His modelling is correct, expressive and rich. With him art has no age. Excuses he does not need, his faults, necessary ruins, have been his needed supports.

Rodin has also been called "the greatest living sculptor of *morceaux*," because his work has been hitherto confined to single figures, or groups of not more than two figures. He has not yet completed any compositions like that by Rude on the Arc de Triomphe, or those by Carpeaux on the Opéra, and Palace of the Tuileries. Great sonnets he has written in sculpture, but no epic poem, as the door is not complete.

Because of this, and in face of all that he has done, cautious critics suspend conclusive judgment. "Wait until the door is done," they say, "and we will determine his place and destiny."

The fact, that every one of the hundreds of figures made for the door are complete compositions of themselves, often representing all there is of a given sentiment, and that as a whole, they comprise the entire expression of human sorrow, and its attendant emotions, seems to have been forgotten by these timid friends of art. Even if these images were never put together in any composite correspondence, they would still form a logical, unique, though unconventional composition. So little does Rodin sympathise with the circumstances that have surrounded him during the past ten years, that to-day, in the full possession of his powers, his sole ambition is to re-live the time of "The Age of Brass;" to begin again to make a simple piece of sculpture without reference to subject, and independent of all intricate abstraction. To enjoy the pleasure of the soul as its emotion is passing out of the ends of his fingers into a piece of clay.

RODIN AS A MAN.

It has been well said by some unknown writer who visited Rodin's studio, that "If tribulation purifies and fortifies a man, Auguste Rodin ought to be an angel by this time, with the virility of a god. Yet he is a timid, tender nature, dreamy and given to abstraction. When you meet him he seems to descend from the clouds and to come from the assembly of the immortals. He looks at you with two large, soft, yet piercing blue eyes that excuse the necessity of an introduction. He is a small man, blonde, with a florid beard, short hair, beautiful hands, and very simple and direct in all his movements. His voice is low, very agreeable, and he uses the simplest language."

In height Rodin stands about five feet and seven inches, and weighs one hundred and forty pounds. His head is large, perceptives immense, line of forehead and nose almost pure Greek, prominent nose, and projecting well out. The forms around the eyes are large and fine, strong chin, and firm mouth. He is slightly short-sighted, and wears glasses. He talks art as he makes it.

Though living all his life in the studio, he is a keen, correct and large observer of men and things, and has gathered in the inevitable conclusions. He judges human nature as absolutely as he does art; on principle, mercilessly; on the score of sympathy, with the tenderness of a warm and considerative heart.

Fortunate in having neither taste for luxury, love of society, or care for the world's applause, he has been all the better able to endure the monstrous necessities of his early life, and the prostitution of every art-sensibility that he desired to keep pure while working for his bread. Though tormented by a turbulent imagination, his savage tenacity carried him safely through. Master of himself, never violating his own nature, he has preserved himself. He has escaped the turmoils and complexities of modern life, and enjoyed to its full the best of encouragement, the invariable censure of every one.

Fortunate, also, in escaping the falsities of any regular system of art-education, he has not been obliged to unlearn that which bad systems have taught. Traditions have never seriously affected him; confiding in himself, he went ahead, blindly, as he knew, but always ahead, surrendering nothing, conciliating none.

If the memory of the misery of the first forty years of his life has left so bitter an impression that now, when he is fairly comfortable, he can hardly realize the change, he makes no complaint nor finds fault with any. The philosophic healthfulness of his nature, the world of art, and the possession of the best of wives have long since confirmed him in the love of peace and work as the very boons of earthly comfort. Never dreaming of attaining any great excellence in his profession, or occupying a high position in the world, he has suffered no disappointments of ambition, and is content with the chances of good and bad as they have happened. Professional slights have never disheartened, nor misfortune or abuse frustrated him. He has run his race, thinking of and seeing nothing but his goal, the pleasure of work. In that he has found his highest happiness, and, as he joyously says, "My years have been thus spent in pure delight. Happiness is found in one's self; work brings it." With such a simple programme, Rodin has had, in the largest sense, the best of luck. Such a life is an ideal realism.

Rodin is bold, proud and simple. He has had something to say, and the good fortune to say it. Of nothing does he speak with so much warmth as of the hearty appreciation and continued friendship of his first art friends, who gathered around him in 1877–78–79. Those who have helped him when he needed help are "men of gold."

Rodin has always been a great reader, not of novels, but of Æschylus, Dante, Shakespeare and Lamartine. Always carries a book in his pocket. He cares nothing for dates, knows little as to when exhibitions of his works took place, and rarely saves a catalogue. Never writes anything except the shortest and most concise letters of business or friendship. Is extremely scrupulous in these matters, and as faithful and generous to his friends as he is exacting in his art. He has little respect for the average art-intelligence, but believes in individual effort. He views with no mild concern the increasingly prevailing and downward tendency of art at the present time; its disposition to cater to everything that is opposed to truth, serious study and good taste; its cowardly subservience to haste, love of money and vulgar luxury.

He thinks that the world is easily pleased, and that the day for great things in art has passed; that the nerve and heroism displayed by such men as Millet, Barye and Rude find little place in the souls of modern artists, and that even respect for the art-productions of other centuries has nearly died out. The modern urgency to have wide streets at the expense of destroying precious examples of architecture he regards as a sacrilege as unpardonable as it is unnecessary. Critical as he is of his own country, he still believes that it has not lost all its taste, and that, with proper effort, a great future of art awaits it.

Public and private appreciation of Rodin has been rapidly on the increase during the past few years. In 1887, his old enemy at Sèvres was discharged, and M. Deck was appointed in his stead. The latter, fully understanding the sculptor's merits, immediately invited him to resume the decoration of vases, free of all conditions, at his own studio, at his own pleasure, and at his own price.

In the same year, 1887, Rodin was appointed by the Minister of Fine Arts as one of the four sculptors who were to form a part of the State Art Commission for the great exposition of 1889.

In January, 1888, he received the long-delayed decoration of the Legion of Honor, through the influence of his old and ardent friend, Antonin Proust, former Minister of Fine Arts. Two banquets were given him in memory of this event: one by a select company of friends, and the other by eighty of the more distinguished artists and writers of Paris. The sculptor's praises were sung by no less than four poets on these occasions, and their words confirmed by orators and men of state. Perhaps the most significant tribute yet paid to Rodin was his election, by the sculptors of Paris, as a member of the jury of the *Salon* for 1888, and it may be safely asserted that as long as he shall act with that body the history of another "Age of Brass" will not be repeated.

T. H. BARTLETT.

[The end.]

SAFE BUILDING.[1] — XXVIII.

VOL. II. — 1.

THE NATURE AND USES OF IRON AND STEEL.

THE introduction of the use of iron into the construction of buildings has practically revolutionized modern architecture; the introduction of steel promises to make equally great changes. The cost of these materials is comparatively so much greater than the ordinary materials used, such as brick and wood, and, again, the uniformity of their composition and strength is such, that in their use the smallest factors-of-safety are used; that is, the size of material used is very much more nearly equal to its ultimate strength than is the case when using cheaper or less uniform materials. Where, therefore, we "run so closely to the wind," it is essential that the nature and use of the material be thoroughly understood by the architect. Iron is used in three different kinds in building; namely, wrought-iron, steel, and cast-iron. Each has its uses and merits, and its disadvantages. All are really but iron in different combinations. Their differences depend mainly on the amount of carbon they contain. The more carbon, the more brittle, but harder is the iron. The less carbon, the more flexible and elastic, but softer is the iron.

Three Kinds of Iron.

Wrought or rolled iron is the softest, that is iron in its purest form. As it combines with itself a small amount of carbon, it becomes soft steel. The absorption of more carbon makes harder steel, until finally it becomes cast-iron. Pure or real metallic iron does not occur in nature, in commercial quantities, if at all. It is extracted from the various ores of iron, the chief of which are known as magnetite, red and brown hematite, limanite, siderite, etc., being various combinations of iron, with oxygen, forming oxides; of carbon and oxygen forming carbonates; and of hydrogen and oxygen forming hydrates. Other minerals, rich in iron ore, are found, but cannot be used in the manufacture of irons, on account of the large percentages of sulphur, copper, phosphorus and other substances they contain, which, if present in the finished product even to the smallest extent, render it unfit for most uses.

Iron Ores.

In the manufacture of pig-iron, the ore — or preferable an intelligent mixture of ores — after being broken in the stamping-mill, and washed in streams, and then roasted or calcined in kilns to remove the moisture and carbonic acid, is smelted in a blast furnace with the addition of coal or coke (or a mixture of both), as fuel, and limestone, or some substitute, as a "flux." The blast furnace itself is roughly of the form of an upright hollow cylinder, sometimes 100 feet high, but usually from 50 to 80 feet high and from 20 feet to 25 feet in diameter. The structure has a strong masonry foundation on which rest about

Manufacture of Pig-Iron.

Blast Furnace.

[1] Continued from page 5, No. 651.

eight cast or wrought iron columns, some 10 to 20 feet in height. These sustain a plate-iron casing enclosing the whole furnace from bottom to top. Inside, the furnace is of the shape of two truncated cones, placed base to base over each other, with a short cylinder at the bottom, being thus somewhat narrower at the top and bottom. The bottom of the furnace is called the "hearth;" about 5 feet to 7 feet above the hearth is the "crucible;" from hearth to crucible the furnace is cylindrical and from 6 feet to 12 feet diameter. From the crucible to the "bosh" which is some 20 feet to 30 feet above the hearth, the furnace enlarges to some 14 feet to 20 feet diameter, sometimes even 25 feet diameter. From here to the "throat" which is the extreme top, the furnace narrows down again, being some 10 feet to 15 feet diameter at the top. The furnace is lined inside with an infusible lining of fire-brick, and the charging of ore, flux and fuel is kept up constantly, and of course the fire and smelting process kept going, without stop, barring accidents, for many months at a time, and until this lining gives out: as a rule, the fire is continuous for from two to four years. The lower end of the furnace is closed save for an orifice at the bottom pierced through the walls about horizontally and known as the "hearth." In this pit the melted iron as it is reduced, being heavier than the flux, impurities or fuel, settles down and collects, until sufficient is obtained to justify the tapping or withdrawal of the plug from the orifice, when, of course, the pressure from above forces out the molten iron, which being thus withdrawn flows off through dikes and furrows in the sand of the casting-house floor. This tapping is done from three to four times every twenty-four hours. The main or feed channels through which the metal flows off directly from the furnace are known as the "sows"; at right angles to these, at frequent intervals, are the short furrows known as the "pigs." These are of convenient size for handling, and when cooled, are broken from the "sows" and form what is known in commerce as "pig-iron."

Hearth and Crucible.

Casting Pig-Iron.

Just under the crucible, that is, above the level to which the melted iron is allowed to rise in the hearth, or some 3½ feet to 6 feet above the hearth, there are from five to eight radial openings in the walls of the furnace admitting the "tuyères" which are blast nozzles, cooled by the circulation of water in them, and through which hot or cold air is forced horizontally into the blast furnace. The product is known accordingly as "hot blast" or "cold blast." The pressure under which this air has to be forced in, varies, according to circumstances, between 3 and 15 pounds per square inch.

Hot and Cold Blast.

As already remarked, the walls of the furnace widen out above this forming what is known as the "bosh" or the main body of the furnace. Above this the walls usually narrow down, the narrowing, however, depending upon the ore used or the product desired. This part is called the "stack." In the bosh and in the stack the distinctive phenomena of the blast-furnace mainly take place. The top where the walls always narrow down considerably, forming the "throat" of the furnace, is usually closed nowadays by a cone drawn up against a conical hopper, and only opened to allow of the charging of ore, flux and fuel, which is done in alternate layers, after lowering the cone a little. The cone, of course, being again drawn up tightly into place, after the charging. The furnace is kept constantly full to the throat, being charged as often as the material settles or is withdrawn. The charge usually consists, first, of from 1 to 3 tons of fuel — (coal, or coke, or both) — and then a mixture of ores in proportion of 1½ ton of ore to each ton of fuel. After this the limestone or flux is put in, being in weight from 40 per cent to 60 per cent of the ore. The materials are hoisted to the top in iron barrows by proper machinery. Where the tops of furnaces are kept closed, the blast — (or heated gases at the top) — is conducted off through flues immediately underneath and around the top. Part of these heated but otherwise waste gases are then passed through iron flues to the brick chambers, called "hot blast stoves," or around iron pipes, and serve to heat the "blast" or feed draught of the furnace, where a "hot blast" is used, thus saving fuel, increasing the output and effecting a considerable change in the nature of the pig-iron.

Charging Furnace.

Hot Blast.

The air for the hot blast is heated by passing it through the above mentioned iron pipes around which the gases play; or, where the brick chambers are used, the gases are turned into the chambers alternately, that is, one after another until the brick linings of one set of chambers are highly heated; the gases are then turned into the alternate set of chambers and the air to be used in the hot blast is admitted to the first set and becomes quickly heated to a temperature of from 900° to 1500° F. by contact with the hot bricks. As these cool the process is reversed, the alternate chambers being now used. These chambers are about 17 feet diameter, 60 feet high cylinders of plate-iron, made air-tight and lined with fire-brick. The interior being lined with a mass of intersecting flues of fire-brick. The balance of the hot gases which do not pass to these chambers are used to heat the boilers, which supply the necessary steam-power for the hoisting machinery, forced blasts, etc.

The process of smelting ores into pig-irons is, then, roughly this: The ore, flux and fuel are charged into the furnace from the top, in alternate layers at stated periods. A fierce fire is kept going and supplied with the necessary air (either hot or cold) for combustion at the bottom by means of a forced draught. As the above layers descend in the furnace they change their nature. The fuel gives out carbonic oxide which reduces the iron. The latter gradually separates from its impurities and combines with more or less carbon from the fuel. The ashes of the fuel and impurities of the ores combine with the flux (the melted limestone), and when all reaches the bottom we have the pure melted iron (with more or less carbon) at the very bottom or hearth; over this, in the crucible, float the melted flux and combined impurities; above come layers of less perfect iron, flux, partly-consumed fuel, and so on to the top. Before drawing off the melted iron at the bottom, the impurities and flux, known as the "slag," immediately above the melted iron, are first drawn off.[1]

Description of Process.

To be more technical in the above description, we should say that the ores of iron, whether oxides, carbonates or hydrates, are reduced either by their preparatory roasting or during their early passage down the top of the furnace shaft to the state of oxide of iron (ferric oxide).

Chemical Process.

The ensuing reaction in the furnace is, therefore, for all practical purposes, the reduction of this ferric oxide (Fe_2O_3) when red hot by the action of carbonic oxide (CO) produced by the incomplete combustion of the fuel farther down the furnace. The iron gives up its oxygen to the carbonic oxide leaving metallic iron (which then takes up with some carbon) and carbonic dioxide (CO_2) which passes away in the waste gases. It should be noted here that pure metallic iron is infusible at the temperature obtainable in the blast-furnace. Its combination with carbon, however, to the extent of from 2 per cent to 5 per cent renders it easily fusible, and constitutes the pig or cast iron. Were it not for this fact the blast-furnace would be impracticable, as can be readily imagined.

The mission of the limestone or other fluxes, is mainly, when melted, to effect a more ready fusion or separation of the earthy impurities or "gangue" in the ore and to take up the ashy remnants of the fuel. It is found that the earthy bases are more fusible to an extraordinary degree when they are present together in numbers. Further, the addition of lime takes care of the silica present in the ores, which otherwise would unite with the iron, forming silicates of iron, which, though fusible, are difficult of reduction, and further prevent to a certain extent the taking up of carbon by the reduced iron, thus entailing a waste in two ways. The ordinary gangue or matrix of iron ore itself is clayey (argillaceous) or quartzose (siliceous). The addition of lime or limestone (or dolomite) results in the formation of a "slag" which is readily fusible at the existing temperature. This slag, which when cold somewhat resembles bottle-glass, is much lighter than the molten iron, and as it collects above it, is drawn off just before casting from the surface of the melted iron in the hearth through openings placed at the proper level, just below the crucible.

Use of Flux.

To undertake to enumerate all of the brands of pig-iron used in casting would be an endless task. A few, however, may be here mentioned.

Brands of Pig-Iron.

Amongst those principally used in the New York market are:

Coltness, Summerlee, Shotts, Langloan, Dalmellington, Clyde, Eglinton, Glengarnock, Gartsherrie.	All Scotch brands; used as *softeners*, in connection with scrap-iron or lower grades of American pig-iron for cheap and inferior castings.
Clenor, Lowther, Lonsdale.	English Bessemers: are soft and strong and are used in place of best Scotch iron.
Manhattan, (New York), Low Moor, (Virginia), Thomas, (Penn.), Crane, (Penn.), Musconetcong, (Penn.), Gloss, (Alabama), Woodward, Spearman, Carbon, Granger, South Pittsburgh, Alice, Cilico, Chattanooga, Hudson, Cold Spring, Sheridan, Leesport, Coleraine, Brier Hill, Secaucus, Cuslic, Poughkeepsie, Copley, Glendon, Andover, Tayler, Cornwall, Bethlehem, Standeye, Allentown, Harry Clay, Harrisburg, Mill Creek.	All American brands.[2] The Manhattan is very fine; Secaucus and Cuslic are very strong; Thomas and Glendon are very popular and their Nos. 1 and 2 largely used for strong and good castings. The last three on the list are weak and soft cinder irons and are unfit for architectural uses, being used principally for stove-plates and pipe making.

All pig-irons are graded in three kinds, namely, Mill iron, Foundry iron and Bessemer[3] iron. Each of these is again subdivided into the following six grades:

Grading of Pig-Iron.

[1] This slag forms the basis of the "mineral wool," largely used for various purposes.

[2] For makers' names and addresses, see "The Directory of the Iron and Steel Works of the United States," published by the American Iron and Steel Association, 261 S. 4th Street, Philadelphia.

[3] Any foundry iron which is sufficiently low in phosphorus (not over 0.1 per cent) and silicon can be used in the Bessemer process.

No. 1.
No. 2.
No. 3.
Grey Forge.
Mottled.
White.

"No. 1" is the best and strongest, "No. 2" the next best, and so on to the "White," which is the poorest quality. Grey irons contain more graphitic carbon and are softer and more fusible than white irons, which contain more combined carbon, and are much harder and more brittle.

If the pig-iron on fracture is dark grey with spots it is soft and will run freely into the mould, making a good casting but not a strong one. Black specks, if present, mean carbon. If the carbon in the iron is chemically combined, it will show white metal, with no specks, on fracture, in which case the iron is very hard and brittle and will not flow easily into the mould, but will make a very strong casting.

For rolling or mill work the most used are the Nos. 2 and 3, Grey Forge and Mottled of the mill irons. For castings the most used are the Nos. 1, 2 and 3 and Grey Forge of foundry irons; the Mottled and White being usually sold for cheap mill-work.

For steel the iron should be as free as possible from phosphorus and sulphur, and the same, so far as possible, for rolled-iron. The presence of these makes iron fluid and soft and good for fine castings, but unfits it for rolling or forging.

Irons for mill and steel work are usually much stronger than for foundry work.

Scotch Softeners. Scotch irons are used in castings to make the melted iron more fluid, to soften it; but they greatly weaken the casting. For very fine castings, Coltness is the best and softest. For ordinary architectural castings, such as columns, lintels, etc., either Glengarnock or Eglinton (both Scotch irons) can be used; using one-third Scotch to two-thirds of some good American iron; using Nos. 1 and 2 of the latter in equal proportions.

Sloss (American) iron is now frequently used by good manufacturers as a softener in place of Scotch iron.

Strong Pig-irons. For good and yet strong castings, use Thomas, Crane, Copley, Manhattan, Low Moor, Glendon or Coleraine. Add Sloss or Scotch for extra fine castings. Or add Glendon, Secaucus or Castle for extra strong castings, using the No. 1 mill irons for the strongest work.

For rolled iron-work use Glendon, Andover, Taylor, Thomas, Stanhope, Allentown, Cornwall or Bethlehem. The latter two being used for steel.

There is a very strong and tough charcoal iron from South Carolina, but it is used mainly for car-wheels, being too expensive for ordinary work, other tough charcoal irons are made in many places from Michigan to Alabama.

In every case the better qualities (Nos. 1 and 2) will, of course, give the best results.

Unwin compiles (from a paper published by Mr. Turner in the *Transactions* of the Iron and Steel Institute of 1880) the following Tables of percentages, density and weight, for cast-iron:

TABLE XXVI.

ANALYSIS OF CAST IRONS.

	Combined Carbon.	Graphitic Carbon.	Silicon.
Greatest softness	0,15	3,1	2,5
" hardness	—	—	under 0,8
" general strength	0,50	2,3	1,12
" stiffness	—	—	1,0
" tensile strength	—	—	1,3
" crushing strength	over 1,0	under 2,6	about 0,8

TABLE XXVII.

DENSITIES AND WEIGHTS OF CAST IRONS.

MATERIAL.	Density.	Weight per cubic foot in lbs.
Dark-gray foundry-iron	6,80	425
Grey foundry-iron	7,20	450
Mottled foundry-iron	7,35	458
White iron	7,50	474

For wrought-iron Unwin gives this analysis:

Carbon 0,02 to 0,25 per cent; Manganese 0,0 to 0,3 per cent; Silicon 0,0 to 0,2 per cent; Sulphur 0,0 to 0,015 per cent; Phosphorus the same, and Pure Iron 99 to 99,6 per cent.

For steel, of course, the proportions vary greatly with the amount of carbon it contains.

LOUIS DE COPPET BERG.

[To be continued.]

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE HORSES OF ITALIAN STATUES.

WASHINGTON, D. C., June 10, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Your contributor in his admirable and interesting papers upon "Equestrian Monuments" remarks upon the family resemblance of the antique bronze horse ridden by the Marcus Aurelius of the Capitol and the horses of the Middle Ages under Colleoni and others. I remember that the Aurelius charger seemed to me very unsatisfactory till, seeing the monument itself at Rome, I had the opportunity to compare it with Roman horses used by Pius IX in his carriage and for mounting the Papal guard. I think it clear that these black horses are of the same stock as the one which served the sculptor of the Marcus Aurelius as a model. They differ greatly from the English blood horse, derived from the Barb by careful breeding. Yet it is to be remembered, in discussing the question, that the Romans of the Empire conquered and controlled for years the country of the Barb and of the Arab horse.

M. C. MEIGS.

NOTES AND CLIPPINGS

AN EMPIREAL TEST FOR LEAD.—The minutest quantities of lead in potable waters may be detected by a simple method. The apparatus needed is an ordinary tumbler and two perfectly bright and clean knitting needles. Fill the glass nearly full of the water to be tested, and add eight or ten drops of acetic acid, or, in its absence, a teaspoonful of vinegar. If the water be quite turbid, double or even treble this quantity may be used. The needles should be carefully revolved occasionally. If lead be present in the minutest quantity, in the course of a short time dark or black spots will appear upon the needles, and in the course of six or eight hours the entire surface in contact with the water will be covered with a gray coating, the depth of color of which will depend upon the amount of lead in the fluid. From time to time a needle should be withdrawn and examined with a magnifying glass, if necessary, to determine whether or not a deposit is being formed. The same needle should be withdrawn each time, and one needle should be left in contact with the fluid three or four hours longer than the other. After removal they should be placed in a dust-free box and left for twenty-four hours, as in cases where the amount of lead is exceedingly small a deposit may be formed which cannot be immediately detected, but which after standing for twenty-four hours becomes very perceptible, the color being a yellow or reddish yellow.—*National Druggist.*

SOAPSTONE AND ITS USES.—Attention is being called to the unappreciated uses and preservative qualities of soapstone, a material which possesses what may be regarded as extraordinary qualities in withstanding atmospheric influences, those especially which have so much to do with the corrosion of iron and steel; it being a well-known fact that the inside of a steamer, which is not exposed to the action of salt-water, like the bottom, corrodes much more quickly than the outside. It has, too, an additional quality in this line, one which adapts it in a remarkable degree as a protective paint for ships, and this is the extreme fineness of its grain; indeed, ground soapstone is one of the finest materials producible, and from experiments made, it is found that no other material is capable of taking hold of the fibre of iron and steel so readily and firmly as this. It is also lighter than metallic pigments, and on this account, when mixed as a paint it is capable of covering a larger surface than zinc white, red lead or oxide of iron. In China, soapstone has long been largely used for preserving structures built of sandstone and other stones liable to crumble from the effect of the atmosphere, and the covering with powdered soapstone in the form of paint on some obelisks in that country composed of stone liable to atmospheric deterioration has been the means of preserving them intact for hundreds of years.—*Exchange.*

THE SAN DIEGO, CAL., FLUME.—It is claimed that the recently completed San Diego flume is the most stupendous ever constructed in the world, being only a little short of thirty-six miles long. An idea of the gigantic character of the work may be obtained from the fact that the amount of lumber consumed was more than nine millions of feet, or, allowing the very considerable yield of 1,000 feet to each tree, not less than 9,000 trees were required. In the course of the flume there are some 315 trestles, the longest of these being 1,700 feet in length, eighty-five feet high, and containing one-quarter of a million feet of lumber. Another trestle is of the same height, and 1,200 feet long, the main timbers used in both of these being ten by ten and eight by eight, being put together on the ground and raised to their position by horse-power. The number of tunnels in the course of the flume is eight, the longest of which is 2,100 feet, the tunnels being in size six by six feet, with convex-shaped roofing; each mile of the flume required an average of one-fourth of a million feet of lumber for its construction, and the redwood used entirely in the box is two inches in thickness throughout.—*Exchange.*

Silica in Iron Smelting.—Capt. G. G. Mullins, a retired officer of the regular army, is making efforts to introduce into the iron and steel foundries of Chicago an invention which, it is claimed, increases the working qualities, tensile strength, and resilience of the metal in its various forms. The novelty of the invention is the use of silica in the furnace. Silica has been considered a detriment to iron ores, and invention heretofore has striven to separate it from the metal rather than utilize it. Captain Mullins claims that the adverse agent is in reality silicon, the base of silica, and not silica itself. While silicon renders iron coarse in crystal, weaker and more brittle, silica properly applied has an opposite effect. In a pamphlet published by the company pushing his patents, the precise method of using the silica is not given, but effects are scheduled, which, if obtainable, should revolutionize the character of the iron and steel output. Prof. J. B. Johnson, civil engineer of the Washington University at St. Louis, is given by Captain Mullins as authority for the statement that the silica process produces a uniformity of structure, close-crystalled, and fine-grained to a degree not found in unsilicated iron; greater freedom from blowholes; a combined softness and toughness which better adapts the metal for the lathe; twenty-two per cent increase in tensile strength, and ninety per cent increase in resilience, or a power to withstand shock nearly double that of ordinary iron.—*Chicago Tribune.*

Haw Pond's Goings and Comings.—Haw Pond is about seventeen miles east of Cordele, and is perhaps one of the most wonderful natural curiosities in Georgia. It is situated in a low place, with hills on every side sloping down to it. Indeed, it is down hill for miles in going to the pond from any direction. Just at this time every year the water gradually goes down a few feet. Then there is a rush of water, a tremendous roar, and within a few minutes every drop of water disappears. This has happened for years, and it has never been known to prove a disappointment to those who go to witness the disappearance. Last Thursday about a dozen Cordelians left here for the pond. They carried fishing tackle in abundance, and spent a day and night catching any number of the finest specimens of the finny tribe. They met about fifty others who had gathered at the pond to fish and wait for the water to disappear. Where the fishermen dropped their lines to the depth of ten feet Thursday night, there was scarcely a drop of water Saturday morning. In a day the water had disappeared completely. For miles around the ground is said to be unstable and liable at any moment to sink. Only a few weeks ago the bottom dropped out, and now only the tops of the trees can be seen above ground. Every year large crowds from the surrounding county gather to witness the disappearance, and this year there were perhaps one hundred and fifty people there. In the fall, when there is rain in abundance, and the streams are full of water, Haw Pond fills up and waits for the springtime, when it disappears again.—*Atlanta Constitution.*

The Old Egyptian Encaustic Process.—In the older Egyptian mummies the face of the outer casing is usually modelled in relief, in a purely conventional way, but in this latest form of burial under the Roman Empire a portrait of the deceased was painted on a very thin piece of wood and then fixed over the dead face. It is very remarkable to find such fine coloring and skilful drawing in work of this late date, which must have been turned out of an ordinary undertaker's workshop. The portraits, both male and female, are most vivid and lifelike; the ladies are mostly dressed in a purple garment and the men in white, with a red orphrey. The modelling of the flesh is very skilful, and in some cases the coloring reminds one of the Venetian school from its rich depth of tone. A special point of interest about these paintings is their technical execution in the hot wax, or encaustic process, as it was called. The pigments were mixed with melted wax, and then fixed in their place by holding a charcoal brazier near the surface of the painting, as is described by Vitruvius. The somewhat lumpy *impasto* of the surface is due to the hardening of the melted wax when the brush touched the cold surface of the panel, and, owing to the non-absorbent nature of the wood, the subsequent application of heat was not able to drive the wax below the surface, as was the case with encaustic painting upon stucco. One of these portraits is noticeable from its ornamental framing with a flowing pattern, formed by pressing wooden stamps upon soft stucco, which was afterward gilt, a process exactly like that which was so often used to decorate mediæval pictures on panel, especially retables, or *ancone*, as the Venetians called them.—*The Saturday Review.*

TRADE SURVEY.

The strongest feature and most important tendency in the commercial and general business situation is the decided tendency of prices in the downward direction, notwithstanding all that has been said concerning recuperative agencies at work. In every direction, almost, symptoms of declining prices are observable. The forces at work in this direction are stronger than business men and financiers generally believe. Every week or so, elaborately-prepared articles appear in our trade and financial papers proving beyond the possibility of a doubt that at last and finally bottom prices have been reached, and that now is the most favorable time for parties who have money to invest in railway and other securities, and to put money in the various new enterprises. The outside public does not act upon these suggestions. Foreign capitalists show the same indisposition, or rather, suspiciousness. Throughout our own country everywhere this is at work to crowd prices still a little lower. As an indication of this in railroad securities, it is to be noted that commissioners of railroads have informed managers of all the railroads running through the State of Missouri that on June 25 they will be required to show cause why rates should not be reduced from ten to fifteen per cent after July 15. This action is the result of similar action taken some time ago in Iowa, Kansas and other Western States. The "Q" system has given notice that on Monday a reduction in rates upon its lines will go into effect. Lake Superior lines have also reduced rates. The Chicago & Alton has reduced rates on lumber to Missouri River points. Like reductions have also been enforced on several Southern roads and in some roads in the far East, notably in Ohio and Pennsylvania and New York. The explanation of this is simply that competition is working its way into railroad matters, as it has in all other directions. Railroad managers have for years maintained a belief that their arbitrary rates could be maintained, and they have disregarded more or less the appeals of shippers and the public generally. They would not permit fair rates. Recent reductions in prices clearly show that a remodelling of schedules will now take place throughout the country. The work will be done gradually, but no power can arrest it. One fact worth referring to in this survey is from the statements made by small manufacturers and shippers along lines of roads throughout the country, to the effect that the Interstate Commerce law is helping to build up little industries and little villages throughout the country, which development a few years ago was impossible. No harm is to be feared from the lowering of prices. The industries of the country are arranging themselves over again with reference to cost and production. New England manipulators largely controlled the boot and shoe trade. Massachusetts has no longer such influence, and it is not such an important factor in the paper trade. Wisconsin, Michigan, Indiana and other States are coming to the fore with mills with the finest equipments and with water-power in many cases, which reduces the cost of production way below any price thought probable a few years ago. The makers of paper-making machinery are reporting themselves unusually busy with contract work for new mills, and old mills have been compelled to adopt the policy of putting in new machinery, in order to prevent themselves from being crowded under. The manufacturers of hardware of all kinds, especially throughout the New England States, have begun to do a busy summer's work for the fall and winter. Contrary to the indications of last spring, jobbers and retailers are now stocking up with larger supplies of standard goods. Builders' hardware of all kinds, carriage-builders' and wagon-makers' materials have been in excellent request. In fact, carriage-builders, especially in the West, say that this season has been an exceptionally good one in all respects, excepting their margins on work. Throughout the New England States there is comparatively little just complaint among manufacturers. The textile mills are moving very well. At Fall River, the dividends paid and the new factories projected and building show that the great industry there is in a healthy condition. Throughout the smaller towns and villages considerable new work is going on. Jobbers and commission-house men are advising a continuation of the conservative management of the past few months, but at the same time they feel much more hopeful than they did during March and April. The recent large auction sales at advancing prices have given confidence to the trade and to manufacturers. Another good indication is the fact that a great deal of American textile machinery is now under contract not only for mills in the South, but for mills in the New England States.

The hosiery manufacturers despite the sharp and bitter competition of European makers is guiding itself into new markets where competition is less hurtful, and the pioneers in the movement are achieving a success which shows that energetic enterprise is able to lead competition in the long run. There is nothing in the textile manufacturing situation that is actually discouraging. The woolen goods manufacturers expect to do a large business. The cotton-goods mills are now nearly all well employed. Stocks are now by no means unwieldy, and the consumption of goods in all sections of the country has not fallen below the average of recent years. On the contrary, the average has been exceeded. The manufacturers of machinery, of boilers, engines and implements, especially for agricultural use, have had an excellent season, and while the stocks of implements in Western distributing centres are large, the best authorities there do not believe that there will be any stocks left over after the buyers have come in. It is the intention of the farming interests of the West to extend their area, as it is the intention of the cotton-growers of the South to increase their cotton-producing territory. The fair prices for cereals, and the advancing prices for cotton, have served to strengthen confidence throughout the agricultural regions and elsewhere. A great deal of new Western and Southern territory has been opened up within the past twelve months. The old stories of the influx of capital into the West and South can only be told over again, so no very extended reference to it is necessary. The furnaces of the South are selling every ton of iron they can make. The daily consumption of crude and finished iron, of cheap dry-goods, and of shop and mill products generally, is growing with amazing rapidity in all the Western and Southern States. New industrial centres are springing up. Northern iron-makers dare not place prices up for iron without consulting the ironmen of the South. The Michigan and Wisconsin lumbermen cannot advance prices of lumber to Missouri River points without taking into account the movements and opinions of the lumber operators in Arkansas, Mississippi and Georgia. There is a centralizing process on one hand and a decentralizing process on the other hand. No one centre exercises the same controlling influence that it did a few years ago. Monongahela Valley coal is likely to be driven out of Missouri River points. The new coal developments all over the West are making industrial possibilities clear beyond the conception of the average newspaper-reader. While all these things are true, there are influences at work which call for more prudence. This is being shown by a great many business men. Occasional symptoms of a stringency in money have taken place recently, and dealers have failed because of the impossibility of collecting money to meet their obligations. Commercial agencies do not sound any alarm as yet over these difficulties, but the attention of commercial men and financiers is directed to the possibility of greater difficulties in the collection of debts and the settlement of accounts. The iron trade began to improve last week most unexpectedly. The chief strength was manifested in Pennsylvania, more particularly in Philadelphia. Finished iron has been advanced nominally $2 per ton. Steel-rails are held at 50 cents higher than a week ago. Crude iron has not been advanced, for notwithstanding the fact Southern iron might be crowded in under any advance. There is an enlarged demand and a wider inquiry in nearly all Eastern markets between Boston and St. Louis. Heavy lumber shipments continue from Chicago, Savannah and Mobile to Eastern markets. The great disaster in Pennsylvania will call for immense quantities of lumber, iron and steel, as well as a vast quantity of mill and shop products. Some thirty to forty bridges of considerable size were lost in that catastrophe, besides cars, locomotives, shop equipments, tools and machinery without estimate. The Cumbria Iron Works were not as badly damaged as first supposed, and it is thought that nearly all departments of this works will be in operation by the 1st of July. Last week the steel rail allotment was increased 200,000 tons. Railroad-builders have not yet begun active work, but probably will in July; but, it is not yet too late for some surprises in this direction. Mining operations in nearly one-half of the anthracite coal fields of Pennsylvania were temporarily suspended by floods, but work will be resumed next week in many mines.

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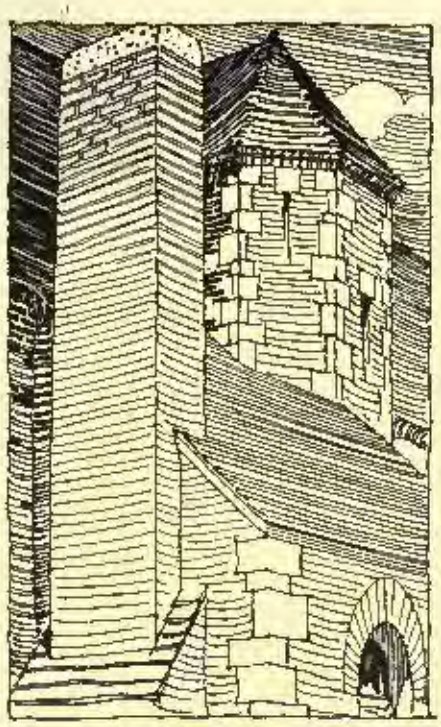

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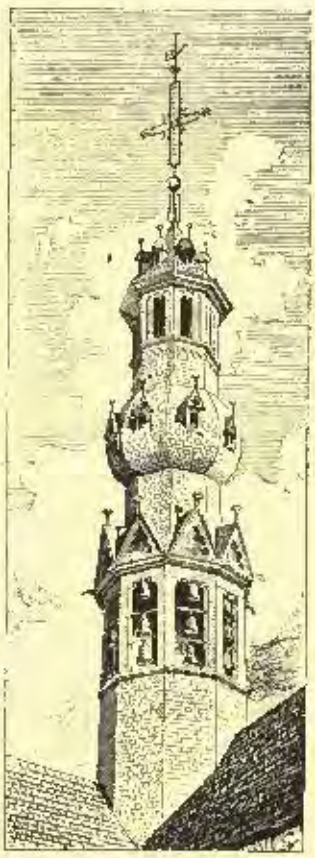

From
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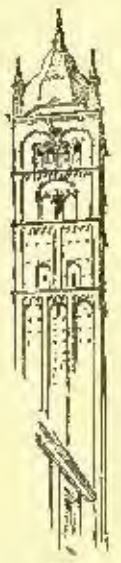

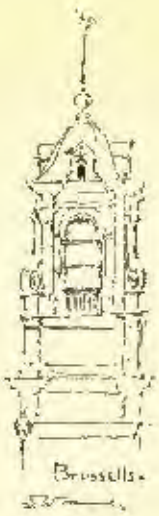
Brussells

From Bruges
Belgium

TOWERS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 22, 1889.

Entered at the Post-Office at Boston as second-class matter.

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A QUESTION of extreme importance to architects in this country has recently been raised in Europe in exactly the form in which it presents itself to us. The Government of Roumania, having occasion to build two great bridges over the Danube, procured designs from native engineers, and had them worked out in detail, and then found itself confronted with the question whether it would be better to use steel or iron in their construction. The Roumanian engineers, who are mostly educated abroad, do not lack skill, and in this case they showed in a signal manner that they possessed, what is, if possible, better than skill, modesty and common-sense, for, instead of evolving from their moral consciousness an opinion as to the relative merits of the two materials, they frankly confessed that they did not know, and that very few men did know, which, in the present stage of the manufacture of rolled iron and steel, would be the safest and best for the purpose. The Roumanian Government, therefore, sent to the General Council of the great French semi-military corps of the Ponts et Chaussées, asking for its advice on the subject, on the ground that the French engineers were more familiar with the question, and had better opportunities of judging, and that their opinion would, therefore, be of more value than that of the native professional men. In response to this request, the Council of the Ponts et Chaussées appointed a commission of three members, who not only prepared a careful opinion, based on French experience, but made a number of original experiments, to determine obscure points, and consulted foreign engineers known to have had exceptional opportunities for forming opinions which would be of value. The result of all these investigations was presented in a report, which has been printed in the *Annales des Ponts et Chaussées*, and is certainly the most important contribution to the literature of construction which has appeared for a long time. After recalling the disastrous failures which followed the early attempts to substitute steel for iron in construction, and which are familiar to architects, the report says that the manufacture of mild steel has of late been very greatly improved, so that the lack of homogeneity which led to most of the early accidents is now not much to be feared, while the methods of rolling and working, and particularly of riveting, have also been modified to suit the peculiar qualities of the material, with signal success. At the same time, the price of steel has been lowered until it is now in Europe about ten per cent more expensive, weight for weight, than rolled-iron. Under these circumstances, the commission says that "both for naval and civil constructions steel of good quality may, in a great number of cases, be used with perfect safety in place of iron." In the case presented to it, of the bridges across the Danube, the commission says that for the wide spans, which are crossed by girders more than five hundred feet long, it would be particularly desirable to use steel, not only for economy of money, since the necessary strength could be obtained with forty per cent less weight of steel than of iron, and even at the European prices, the steel would cost considerably less; but because the load on the piers, which stand on very soft ground, would by the use of steel be considerably diminished. For the short side spans the gain by using steel would be much less, and here it advises that the option should be left with the contractors to obtain the required strength with either iron or steel, but it remarks that even for these the steel would be more reliable, if not cheaper, since the manufacture of rolled-iron has, in its opinion, deteriorated about as fast in Europe as that of steel has improved. With us, it is probable that the manufacture of iron in the best mills is still kept up to the high American standard, and we are not sure that the steel-mills here have improved their processes as much as those in Europe, but the prices fixed by the rolling-mill combination are here the same for steel as for iron, for equal weights, and we can afford to allow a considerable margin for uncertainty as to the quality of the steel, and still save a good deal of money by its use. The subject is so extremely important that we hope it may occur either to the revivified American Institute of Architects, or to the Society of Civil Engineers, to collect some reliable information of the kind in regard to American structural steel, before another year has gone by. If we are not mistaken, some tests have been recently made of steel and iron beams at the Massachusetts Institute of Technology, under the direction of Professor Lanza, and the results of these will certainly be of the utmost value.

A CURIOUS matter of jurisprudence is under discussion in New York. A law went into operation there on the first of January, abolishing executions by hanging, and ordering the substitution of death by electric shock. The first person who has had an opportunity of trying the new plan is one Kemmler, who murdered somebody, probably without taking a great deal of trouble to do so in the most agreeable and painless way, and has in consequence been condemned to lose his own life by the least unpleasant process that science has been able to devise, as a means of deterring others who may be meditating the slaughter of their fellow-men. Fortunately, perhaps, for Mr. Kemmler, but unfortunately for people who do not wish to murder any one else or to be murdered themselves, a powerful influence is, it is said, being exercised to have the sentence commuted, or the method of execution changed, the plea urged being that the Constitution forbids the infliction of "cruel or unusual punishments"; but the fact that a poor and friendless murderer is able to command the services of some of the ablest and most expensive lawyers in the State in defending such a worthless and ridiculous plea indicates, to the mind of experienced persons, that some wealthy corporation has found it for its interest to obstruct the course of justice, and public opinion points to the electric-light companies, which are said to fear that the connection of electric currents and judicial executions in the public mind may injure the sale of electricity. Whether this idea is well founded, we cannot say, although one would think that the almost weekly deaths of innocent persons by the electric current might tend to prejudice people against it quite as strongly as that of a condemned criminal; but if Mr. Kemmler should save his neck, or rather, we suppose we should say, his nerves by this interference, we hope he will be placed on exhibition as an example of what the electric-light companies can do in the way of saving life when they find it for their interest to exert themselves in that direction.

THE *Wiener Bauindustriezeitung*, one of the most useful technical journals which comes to our office table, contains some tests of the quality of roofing-slate, which are now. It seems that an important lawsuit against a contractor turned

to some extent upon the quality of the slate used on the roofs of a row of houses, and an expert chemist was appointed by the court to examine the slate, and give testimony concerning their quality, and concerning the properties of roofing-slate in general, about which few architects or builders know much with certainty. The result of his investigations is well worth remembering by every one who has to do with roofing-slate. He found that, as a rule, all slates contain fine lines, running parallel with what may be planes of secondary stratification or of crystallization. By holding a roofing-slate a little below the eye, and inclined from it, these lines may be seen. If they run parallel with the long side of the slate, this is properly cut, and, if of good quality, will keep its place in the roof. If the lines run across the slate, or at an angle with its sides, it is likely, whatever the quality, to break across, or lose a corner, at the least provocation. The hardness or specific gravity, contrary to the usual belief, gives no reliable indication of the quality of a slate. A better test consists in striking them together, or tapping them with a hard substance. If they ring clearly under this treatment, they are likely to be good, and a dull sound on percussion generally shows a poor slate. The familiar experiment of setting the slates upright in a dish of water, and noting how far the water ascends by capillary attraction in the substance of the slate, is still one of the best tests that can be made. In a good slate the water should rise only slightly above the surrounding surface. A slate which draws up the water to a considerable height should be avoided, as likely to be destroyed by frosts and weathering. Some slates, apparently hard and non-absorbent, decompose on exposure to the air, by chemical action. These are best detected by placing samples in test-tubes, and covering them with a saturated aqueous solution of sulphurous acid. A bad slate will begin in a few days to crumble away, while a good sample will resist the action of the acid for weeks, or even months. If a portion of the slate to be examined, when powdered, and covered with muriatic acid, effervesces strongly, the presence of carbonate of lime is shown, and the slate should not be used. If another sample, when powdered, and strongly heated in a test-tube, gives off a yellow sublimate of sulphur, with a smell of sulphurous acid, the slate contains iron pyrites, and will not be durable on a roof.

M. MAMY gives, in *La Construction Moderne*, some more detail of theatrical machinery, which may be of use to architects who have theatres to build and furnish. Speaking of the snow and rain of the stage, he says that the imitation of the natural phenomena is not usually very perfect. For rain, it is usual to employ a long wooden box, partly interrupted at intervals by partitions of wood or sheet-iron, through which small pebbles or dry peas are allowed to descend, with a noise faintly resembling that of a shower. Snow, on the stage, usually consists of bits of paper, thrown down from above. The illusion is anything but perfect, but the better substitutes, such as portions of wool or cotton batting, are too expensive for use. One would think that wood-fibre, as prepared for paper-making, and bleached, might be a cheap and good material, but we do not know that it has ever been tried. Great improvements have recently been made in stage artillery. The old fashion was for the actors to fire blank cartridges at each other, but occasionally a ball-cartridge would get into the guns, to the detriment of the person who happened to be standing in front of them, and one actor was killed on the stage merely by the wad of a cartridge supposed to be perfectly innocent. For this reason, in well-regulated theatres, the actors are not now allowed, even with blank cartridges, to aim at each other, but must fire in the air, and the guns are all loaded by the stage armorer, and are only fired once, for fear of some mischance, so that a large number of guns is required. By the new system, invented by M. Philippe, Secretary of the Bouffes-Parisiennes, the guns used on the stage contain a long spiral spring, which carries a needle at the end. The piece is loaded by compressing the spring, which is retained by a simple mechanism, and inserting in the muzzle a cork, which contains a charge of fulminating mercury. On pulling the trigger, the spring is released, and the needle strikes the fulminate, which explodes, blowing the cork into dust, without injury to any one. Guns of this sort can be aimed directly at their victim without danger, and may be reloaded by those who carry them, so that their use saves a good deal of trouble and expense, and they are rapidly becoming popular among managers.

IT is rather a comfort to think that there is one place in the world where the ethics of competitions are as little understood, or regarded, as in this country. This benighted place is Buenos Ayres, where a competition was invited last year for a grand public building. The sketches were to be handed in on the first of January, and on the appointed day three architects submitted designs. All these, on examination, were pronounced unsatisfactory, and a new competition was called for, to close on the first of April. Eleven architects responded to the second invitation, and, after a suitable time had elapsed, they were notified that the Government had decided to do nothing more about the competition, but to have its plans drawn by the official architect, and they could have their drawings back by sending for them. The *Deutsche Bauzeitung* thinks that this is a warning against engaging in foreign competitions, and we might add that it ought to be a warning to us, who are much worse off than the German architects in this respect, to make up our minds quickly not to submit any longer to the South American method of conducting such affairs, and take steps to enforce our decision.

A HOUSE in Scotland has been provided with a private electric railway, to convey its inmates to and from the railroad station, which is about a mile and a quarter away. Power is obtained from a waterfall some three miles off, by means of a turbine wheel, attached to a dynamo, and giving a current of forty amperes, at four hundred volts pressure. The conductors are bare copper wires, making a complete metallic circuit. The conductors along the line consist of soft-iron rods, supported above the sleepers, and insulated. The line is of thirty inches gauge, and a handsome car is provided, which can be run at the rate of thirty-five miles an hour. Although the railway is principally used for communication with the station, sidings have been arranged, so that it can be used for the purposes of the farm. One would think that a line of this kind might be advantageously employed as an addition to the conveniences of our own mountain hotels. There are many places where the transit from the station to the hotel is made by crowded and uncomfortable vehicles, which could be replaced by an electric car, driven by water-power, at a great saving of expense, and with increased satisfaction to the public.

ONE of the most famous technical schools in Europe is, as was lately shown in the *American Architect*, the Technical High-School in Berlin, which graduates architects, as well as engineers, mechanical engineers, designers of ships, and so on, and it is interesting to compare the statistics which the *Deutsche Bauzeitung* gives in regard to it with those of our own schools of the sort. During the winter term of 1888–89, the total number of pupils in the school was eight hundred and seventy-three. Of these, one hundred and eighty were students of architecture, one hundred and eighty-one followed the course in constructive engineering, three hundred and twenty-three were mechanical engineers, eighty-four studied naval engineering, and one hundred and five took the general courses in mathematics and natural philosophy. For the instruction of these students there were sixty professors, twenty-seven tutors, and eighty-eight assistants. The students appear to come from all parts of the world, one hundred and twenty-three being foreigners. Eleven of these were from England, ten from Roumania, thirty-five from Russia, two from Siam, two from Japan, twenty-five from Norway, and nine from North America.

THE largest steam-engine in the world is that constructed for the new Italian cruiser "*Sardegna*." It really consists of four triple-expansion engines, which can be used together or separately, as desired, the entire combination being capable of developing a force of twenty-two thousand nominal, or twenty-five thousand actual horse-power. The ship is driven by twin screws, and two engines are connected to the shaft of each screw, but one screw can be stopped altogether if the vessel is to be turned around, or, for ordinary sailing, one engine only may be used for each screw; but, in case it should be necessary to increase the speed, the other engines can at once be connected and the full power exerted. As usual with naval machinery, a large number of auxiliary engines are used. On the "*Sardegna*" there are no less than twenty compound auxiliary engines for feeding the boilers, keeping up the draught, and so on, besides a great variety of single-cylinder machines.

BUILDERS' HARDWARE.[1]—XXVIII.

HOOKS.

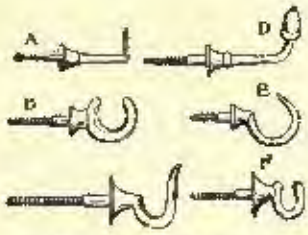


Fig. 417. Screw-hooks.

BESIDES the hooks described in the last chapter, there are other forms which cannot be classed as closet hardware. Figure 417 illustrates several varieties of brass screw-hooks. *A* is made in nine sizes, from ½ inch to 2 inches in length. The same form is made with a sharp-pointed shank instead of a screw, intended to be driven into the wood. *B* is known as a cup-hook, intended to go on strips to receive cups, which are hung by the handle over the hook. This form is made in five sizes, from 1½ to 2¾ inches long. *C* is termed a looking-glass hook. *D* is an acorn-hook, made in six sizes, from 2 to 4½ inches long. *E* and *F* are both picture-hooks. The former is made in six sizes, from ¾ inch to 1¾ inches. Figure 418 represents a hook similar to the preceding, but with a longer shank, being made in seven lengths, from four to ten inches; it is designated as a bird-cage hook.

Fig. 418. Bird-cage Hook.

Picture-moulding hooks are made in quite a variety of shapes, a few of which are shown by Figure 419. The most common form is the second one on the upper row, it being made to match the common stock picture-moulding. A very serviceable hook, not illustrated here, is made with flat brass, with the ordinary contour, quite broad at the top where it fits over the moulding, but narrowing at the bottom to receive the cord or wire. Moulding-hooks are usually made in three sizes, and are always of brass or bronze. Chandelier hooks, Figure 420, are intended to screw through the lath and plaster into the ceiling beams or the furring, the screw part being 2½, 4, 6 or 8 inches long. Figure 421 shows a chandelier-hook provided with a catch, so that nothing can slip out when once hooked.

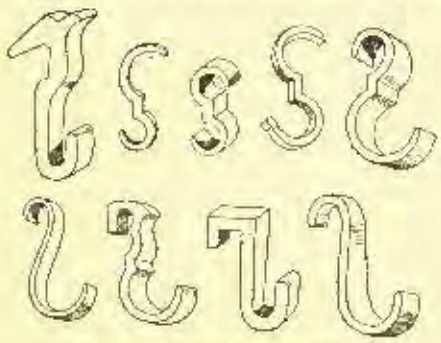


Fig. 419. Picture-moulding Hooks.

Fig. 420. Chandelier-hook. J. B. Johnston.

Fig. 421. Chandelier-hook with Catch. J. B. Johnston.

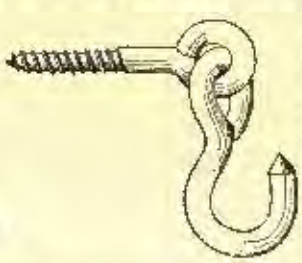


Fig. 422. Hammock-hook.

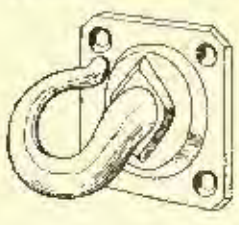


Fig. 423. Clothes-line Hook.

Fig. 424. Awning-hook.

Hammock-hooks, Figure 422, are made of ⅝ inch galvanized or tinned wrought-iron. Clothes-line hooks, Figure 423, are also sometimes used for hammocks, though less suitable on account of the friction of the rope in the hook. A lighter form of clothes-line hook is made to be attached by two screws. These hooks are made in three sizes.

Awning-hooks, Figure 424, are made to drive into the wood, and be caught in eyelets in the awning. They are manufactured in sizes from 1½ to 6 inches.

BRACKETS.

Shelf-brackets have been previously discussed. Some form of inclined bracket is often desirable to support the side-rail of a flight of stairs. One of the simplest consists of a bent plate, Figure 425, screwed to the wall on an angle, so as to bear against the under side of the rail. A better form is screwed to the wall in a vertical position, and has a swiveled bar or plate which adjusts itself to any angle of the stair-rail. Figures 426 and 427 illustrate two styles. Similar brackets are made with fixed rail-plates, and there are a number of varieties in the market differing from those described chiefly in regard to finish.

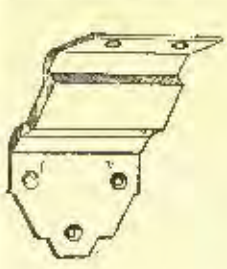


Fig. 425. Stair-rail Bracket. Reading Hardware Co.

Fig. 426. Stair-rail Bracket. Reading Hardware Co.

Fig. 427. Stair-rail Bracket. Shepard Hardware Co.

Bar-rail brackets, Figure 428, are intended to support a round rail such as is usually carried across the front of a bar-room counter. The first form shown is sometimes used to support a round stair-rail, and when made of plain bronze, presents a very good appearance. A bracket like the second form is sometimes used to support an iron foot-rail at the base of a bar or counter.

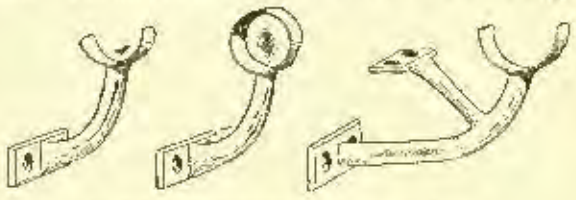


Fig. 428. Bar-rail Bracket. J. B. Stanton & Sons.

All these brackets can be had in either bronze or bronzed iron.

LETTERS AND PLATES.

Very few styles of letters and numbers are kept in stock by hardware dealers. Plain, Roman characters, Figure 429, are usually the only ones on hand. They are in seven sizes, from ½ inch to 3 inches high, and are secured to the door or the woodwork by blind tacks, soldered to the back of the pieces. They can be had in either bronze, brass or nickel-plate.

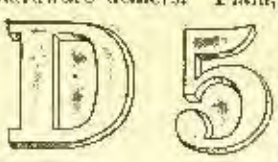


Fig. 429.

Letter-plates are often used to cover the letter-slot through office-doors. Figure 430 shows one style, with a recessed slot protected by a hinged flap. This is essentially what is commonly employed. On fly-doors some form of plate is desirable on each face of the door to prevent the paint from being soiled, and such plates are often marked "push"

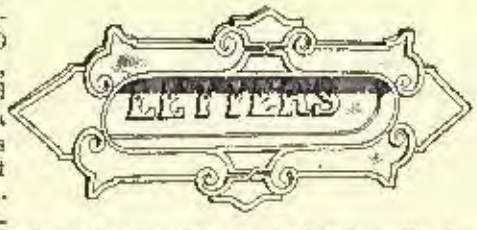


Fig. 430. Letter-Plate. Hopkins & Dickinson Mfg. Co.

[1] Continued from No. 702, page 288.

or "pull." They may be of porcelain, iron, bronze, brass or nickel-plate, the first material being the cleanest and most easily cared for. They are made in all varieties of design, but are in principle too simple to require any illustration.

Fig. 431. Label-plate.

Label-plates are made to order in porcelain quite extensively for druggists' drawers. There are also plates manufactured to go on drawer-fronts and receive card-labels, the upper part of the plate being thinner than the rest, so that the card can be slipped in from above. Figure 431 will illustrate the general form of a label-plate. The neatest style has a plain, rectangular outline in bronze. Label-plates are made in several sizes from about 1 x 2½ inches to 2 x 4 inches.

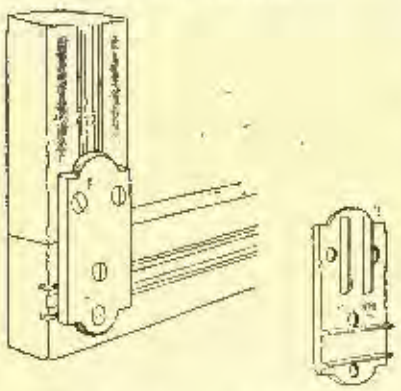


Fig. 432. Screen-door Corner-iron. E. C. Stearns & Co.

Figure 432 shows a plate a little foreign to the present topic, it being used to stiffen the joints of light screen-doors. It is provided with tongues which enter firmly into the wood in each direction, and prevent any sagging or settling. The plates are sold in sets, each set including six-corner irons and a knob or handle, with the necessary screws. The list-price is $5 per dozen sets, in bronzed iron.

FOOT-SCRAPERS.

Foot-scrapers are used much less than formerly. A simple form, consisting of a thin-plate supported by one or two plain drive-shanks is always advisable, however, for the piazza of a country house. Figure 433 shows a more elaborate scraper, intended to be screwed to the floor or step. A form often seen

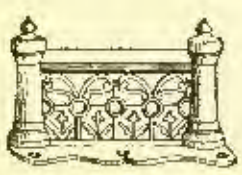


Fig. 433. Foot Scraper. J. B. Johnston.

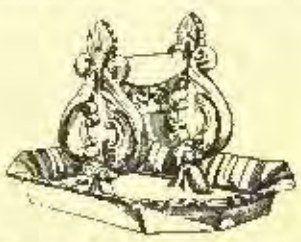


Fig. 434. Foot Scraper. J. B. Johnston.

in some parts of the country, Figure 434, is set in a pan or dish, intended to collect the scrapings. The other varieties found in the market differ only in design or finish, but not in principle. Foot-scrapers are usually of japanned cast-iron.

BELL HARDWARE.

The subject of bell-fittings is too extensive to be considered very fully in detail, especially as bell-hanging is a trade by itself, and the house-carpenter has usually very little to do beyond hanging the simplest kind of kitchen-bell or fitting a gong to the back-door. The front-door is fitted with a bell-pull, as explained in the chapter on knobs. This is connected with wires which usually are carried down to the cellar-ceiling, and across and up to the kitchen. The corners are turned by the aid of bell-cranks. Figure 435 shows the form of crank generally fitted just inside of the bell-pull, and Figure 436 shows a complete set of bell-hanging fixtures, including the bell, which is secured to the wall by a spike driven through the centre of the spiral coil. The elasticity of the coil and the connected spring is so great, that when the fixtures are properly set, the least pull at the front-door will cause the bell to ring. Figure 437 illustrates a different form of bell-carriage, made by the Russell & Erwin Manufacturing Company.

For the back-door it is customary to use some form of gong which can be screwed to the inner face of the door. In the cheapest makes the bell-strike is operated by a handle on the outside, which on being drawn down, releases a spring-hammer.

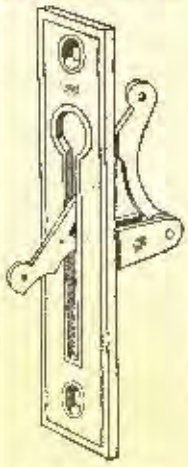


Fig. 435. Bell-crank. Russell & Erwin Mfg. Co.

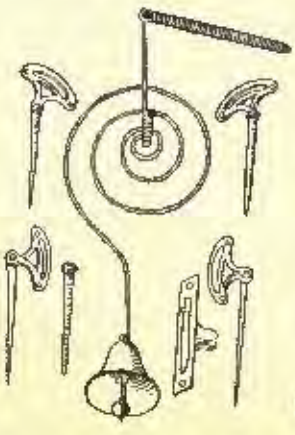


Fig. 436. Bell-hangings.

Fig. 437. Bell-carriage. Russell & Erwin Mfg. Co.

Some gongs are made so as to give a double-stroke. Figure 438 illustrates a double-stroke bell which works with a pull instead of a lever. There is, also, in the market a bell provided with a spring escapement which is set by pulling the

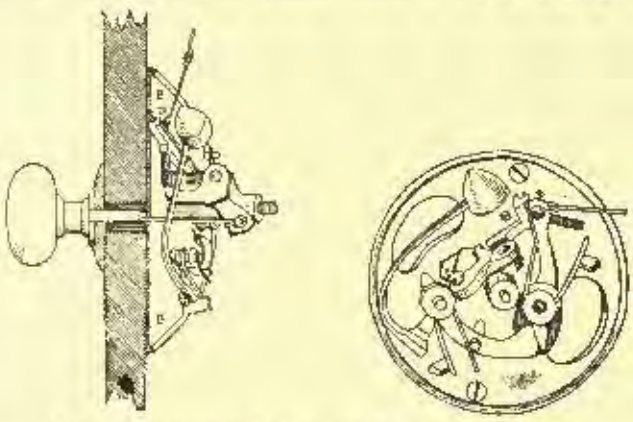


Fig. 438. Double-stroke Pull Gong-bell. Russell & Erwin Mfg. Co.

handle, and gives a continuous ring like that of an electric-bell, lasting about five seconds. This is known as "Bushby's Escapement Bell."

GATE-FIXTURES.

Ordinary strap-hinges are sometimes used for gates, and there are a few forms of heavy wrought-iron butts which also

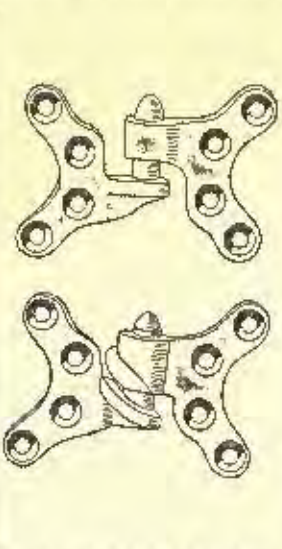


Fig. 439. Self-closing Gate-hinge. St. Louis Pattern. Shepard Hardware Co.

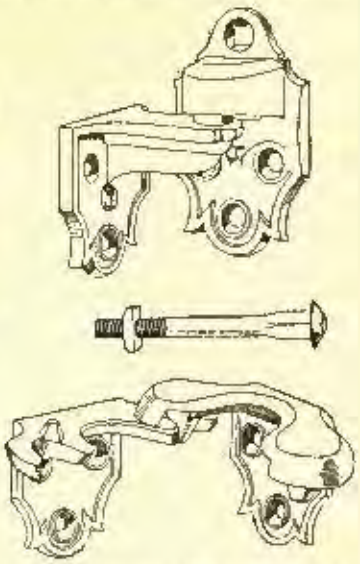
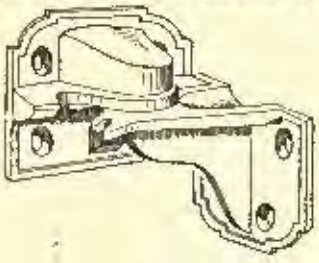


Fig. 440. Seymour's Gate-hinge. P. & F. Corbin.

answer for the purpose; but there is in the hardware market quite a variety of fixtures especially devised for gates, and the

special forms are usually preferred. Gate-hinges are always arranged to be self-closing, generally acting by gravity. Shepard's St. Louis pattern, Figure 439, has the bearing-surfaces of the lower hinge made on a sharp incline, so that when the gate is opened, it is lifted bodily, and descends in closing. This principle is embodied in several different patterns. It, of course, permits the gate to open only in one direction. With



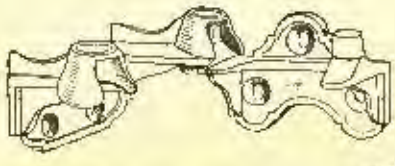


Fig. 441. Gate-hinge. Shepard Hardware Co.

"Seymour's" hinge, Figure 440, the gate is practically suspended from the upper pivot, and bears laterally against two pivots at the bottom, so spaced, that when the gate is open, the bottom is thrown out more than the top, and its own weight is sufficient to close it. Figures 441 and 442 are variations of the same principle, a simpler application of the idea being shown by Figure 443. All of these will open both ways.

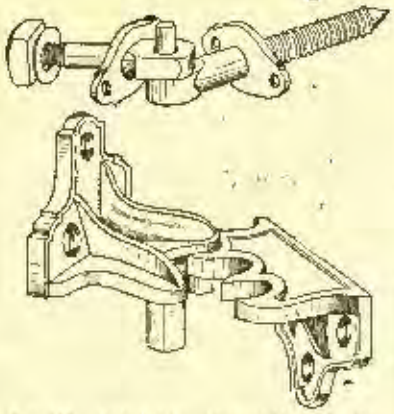
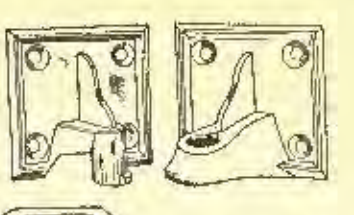


Fig. 442. Gate-hinge. Shepard Hardware Co.

GATE-LATCHES.

A very common form of gate-latch is shown by Figure 444. It consists of a bent lever which is mortised through the gate-frame, the bolt catching in a strike on the post. A spring keeps the bolt thrown out, and the beveled strike permits the latch to be self-closing. With a strike which is beveled each way, this latch can be used for a double-swing gate. Figure 445 shows a latch which is very commonly used with gates swinging only one way. The catch acts by gravity alone. Figure 446 represents a gravity, mortise catch. The latch shown by Figure 447 is planted on the face of the gate-frame, and works with a spring. The latch, Figure 448, is planted on the edge of the gate-frame, which has to be kept correspondingly away from the post. The Yale & Towne Manufacturing Company has a somewhat similar gate-latch, Figure



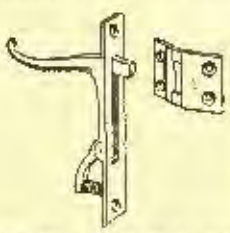


Fig. 444. Mortise Gate-latch. Ireland Mfg. Co.

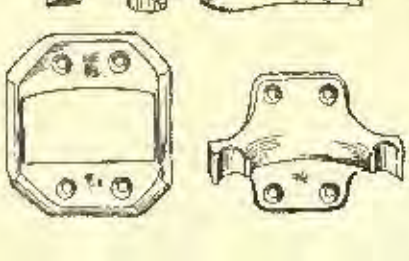


Fig. 443. Gate-hinge No. 20. Shepard Hardware Co.

Fig. 445. Brooks's Patent Gate-latch. Ireland Mfg. Co.

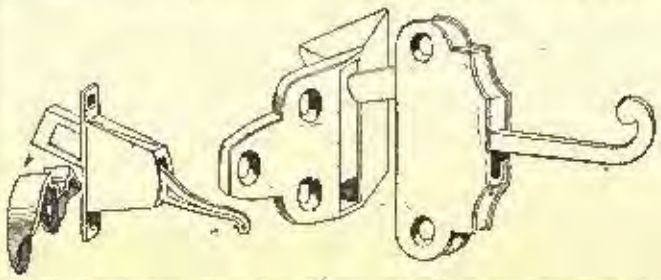


Fig. 446. Gate-latch No. 2. Shepard Hardware Co.

Fig. 447. Seymour's Gate-latch. P. & F. Corbin.

449. Both are opened by pressing down one of the arms. "Seymour's" cylindrical gate-latch, Figure 450, is mortised

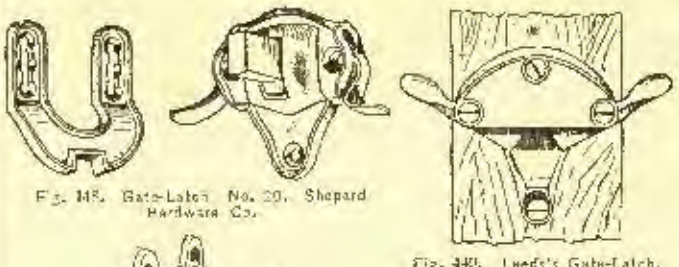


Fig. 448. Gate-Latch No. 20. Shepard Hardware Co.

Fig. 449. Leeds's Gate-Latch. Yale & Towne Mfg. Co.

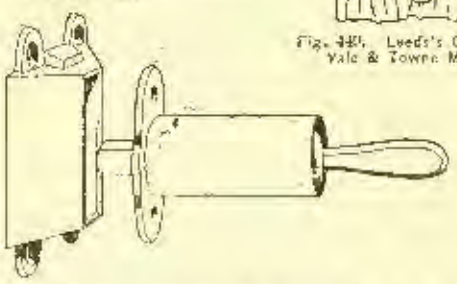


Fig. 450. Seymour's Cylindrical Gate-Latch. P. & F. Corbin.

through the gate-frame, and opens when the handle is depressed.

There are many other styles of gate-hinges, but few which differ materially from those we have considered.

[To be continued.]

SIXTEEN-STORY BUILDINGS. — PROPOSED ORDINANCE TO RESTRICT THE HEIGHT OF BUILDINGS. — THE TACOMA BUILDING. — A PATENT AND CLAIM FOR ROYALTIES. — THE OWINGS BUILDING.

PARADOXICAL as the remark may appear, it is at this moment difficult to guess whether the era of very high buildings in Chicago has ended, or whether it has just begun.

From the old-time four-story office-building, the number of floors slowly crept up to six, then eight, then ten, and now thirteen and fourteen stories seem about to be abandoned in the proposed new gigantic structures of sixteen. However, on the other hand, the city fathers have been revolving in their minds if they shall not take a hand in the matter and stop such "sky-scrapers," so that as this letter is written an ordinance is pending, which, if passed, will practically end the construction of general office and commercial buildings over nine or ten stories in height. Since the completion of some of the high buildings there has been some complaint and many newspaper articles relative to the absence of sunlight in some of the streets and offices lined by these huge constructions. Between the shadows cast by these buildings and the pall of black smoke continually hanging over us, the sun has been almost banished from some of the business portions of Chicago. As a result of the lamentations, the matter has been under consideration by the Common Council for some time, and several schemes have been proposed, notably one, that no building should be erected whose height exceeded the width of the street upon which it was situated. This, however, has been somewhat modified, so that the ordinance, as it will be presented to the Council for action, while taking into consideration the different widths of the streets, does allow a slight excess over such width. But in no case

can any building (towers, spires, etc., are excepted) extend over 125 feet above the sidewalk-line without the written consent of one-half of the property-owners on both sides of the street in that block where such building is to be erected. Within a few days this question will undoubtedly be decided, since (however questionable the act may be) a permit for one of these new high structures has been refused, pending action by the Common Council. What the outcome will be is a very uncertain matter, as both sides claim that they are sure of victory; but, should the ordinance be passed, there is no doubt but that the question of its legality would very shortly be tested in the courts, as there are now on the boards four or more of these gigantic structures shooting up sixteen stories into the air. Should the promoters of these buildings be unable to obtain the requisite permission from adjoining property-owners as very likely would be the case, they would not give up without a struggle.

For the past few years many conservative people have been asserting that no more office-room was needed in Chicago, but each year larger and finer buildings have been erected, only to be at once filled by desirable tenants, and still the work continues without any apparent abatement. Not only are new and magnificent buildings constantly going up, but many old ones are being entirely remodelled, and, where possible, additional stories put on. Offices that are either dark or difficult of access are a drug on the market, and owners of old buildings are, to their sorrow, beginning to recognize this fact even more than ever since the first of last May, when two more new, large and well-arranged buildings were thrown open to the office-renting public.

The Tacoma Building, thirteen stories high, at the corner of Madison and La Salle Streets, has probably been the subject of more comment (both intelligent and unintelligent) than any building lately erected in that district. The construction of the two fronts is that of the iron column covered with masonry that has been so frequently used in Chicago, although in this case it would seem as if it had been reduced to its last expression, since most of the piers have only one thickness of either brick or terra-cotta around the iron core. The window-space is thus increased to its utmost. Large bays, also of iron framework, protected by terra-cotta, project from the second floor and extend through every story to the cornice. This method of iron construction, although not carried to quite such an extent, is one that has been employed here and probably in other cities for many years. An account of a special piece of such construction was published in one of the Eastern engineering papers some six years ago, but lately an architect in Minneapolis comes forth and heralds to the world that it is his invention, and that he has patented it, and practically tells people that any one building iron columns into walls would be infringing upon his patents, and hence could be prosecuted. Some parties are said to have been fools enough to be frightened into paying a royalty. The owners of the Tacoma Building duly received notice that it was an infringement on this patent, and that they would have to pay a royalty. At last reports, however, the patentee has not considered it advisable to push his claim. The rooms of the building in question are extremely irregular in shape, but every portion of the building is well lighted and without a dark corner, so that, with the exception of the elevator-space being too small, the method of planning has been a great success. Built avowedly as a money-making scheme, and every consideration of looks made entirely subservient to that of utility, it is only to be wondered that the exterior looks as well as it does. It is exactly what it purports to be — straightforward construction repeated story after story, and covered with brick and terra-cotta, with a little attempt at a change of design in the upper stories, where some loggias are introduced. Apropos of this building and another of somewhat similar character now being erected, one of the city papers remarked: "Beauty and prominence were the high aims of ancient architecture: for this the labors of many men for many years were thrown into a single structure. From the modern economic standpoint such labor was buried, since it never became self-aggrandizing in the form of capital. Chicago utilitarians are not given to apostrophizing the shades of the Greeks or Romans, or to make burnt offerings to bygone ideals. Chicago is notably fireproof, and, although lines of beauty in arches and columns are all very well, the man of business is not to be deterred from getting what he calls his money's worth by any frivolous objections made by devotees of the æsthetic. . . . These buildings, in justice to the builders and architects, must be viewed as nothing more nor less than huge money-making schemes in what may be called commercial architecture, where space, light, convenience and safety are essential."

This is really the key-note to all of these huge buildings already built or about to be built. They are specimens of "commercial architecture," and as such they are unquestionably a success; but, when viewed in any other way, it takes the most deceiving drawing from impossible points of sight, and with impossible sunlight and shadows, to make them even approach within hailing distance of the artistic. The interior of "The Tacoma" is plainly finished in oak, with a high white marble wainscoting in the halls. Nearly every room or suite of rooms has its vault, and all are furnished with coat-closets and toilet facilities. The entrance-doors, which are light, and not great cumbersome things, have the styles and rails covered on both sides with light bronze-work, making a pretty effect in a manner as yet new here. At one time it was not intended to utilize the attic, except for pipes, tanks, etc., but eventually it was decided otherwise, and the heavy iron water-tanks, although in place nearly two hundred feet above the sidewalk, were bodily raised eighteen feet and placed on the roof — a feat which the contractors declare to be the highest job of raising ever done in the world. It may be interesting to note that the average price of rental per square foot of floor-surface (above the second floor) is not far from $1.45.

The other new building, "The Owings," has already gained, even outside of Chicago, a notoriety on account of an accident that occurred there a few months ago. This building presents much more claims to the picturesque than "The Tacoma," and, moreover, it is very fortunately so placed, on a corner, that its best features can be seen from a distance, and to the very greatest advantage. It has a steep roof, gables and a corner-tower, but the eleven stories of "commercial architecture" before arriving at the cornice are a severe strain upon artistic effort. However, artistically, it is probably the most satisfactory building yet constructed of its kind. The exterior is a combination of stone, brick and terra-cotta, but all in a gray tone which has nothing bright or pretty about it, and materially detracts from the general effect. The best feature of the building is the main entrance, with a large Gothic pediment extending up through two stories, and elaborately carved.

The ground-plan of the building is small, scarcely larger than the auditorium tower, but the rooms seem to have been economically arranged.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

EXTENSION TO THE ADAMS HOUSE, BOSTON, MASS. MR. W. WHITNEY LEWIS, ARCHITECT, BOSTON, MASS.

[Heliotypes, issued only with the Imperial Edition.]

BRERETON HALL, CHESHIRE; BRAMSHILL, HAMPSHIRE; MORETON HALL, CHESHIRE; CREWE HALL, CHESHIRE.

[Issued only with the Imperial Edition.]

These prints are reproduced from Samuel Hall's "*Baronial Halls of England.*"

AGE OF FRANCIS I. — THE DINING-HALL, CHENONCEAUX.

[Issued only with the Imperial Edition.]

THE TOMBS OF THE SCALIGERS, VERONA, ITALY.

See article on "Equestrian Monuments" elsewhere in this issue.

PORTION OF THE TOMB OF CAN SIGNORIO, VERONA, ITALY.

See article on "Equestrian Monuments" elsewhere in this issue.

MONUMENT TO THE DUKE OF BRUNSWICK, GENEVA, SWITZERLAND. M. J. FRANEL, ARCHITECT. M. CAIN, SCULPTOR.

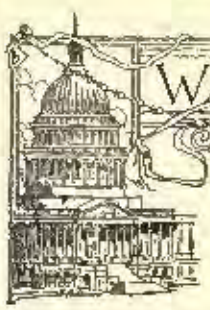
See article on "Equestrian Monuments" elsewhere in this issue.

HOUSE AT MANCHESTER, VT., FOR E. S. ISHAM, ESQ., CHICAGO, ILL. MR. F. W. STICKNEY, ARCHITECT, LOWELL, MASS.

HOUSE OF GEORGE M. JONES, ESQ., GREENSBURGH, PA. MR. J. A. DEMPWOLF, ARCHITECT, YORK, PA.

HOUSE OF J. P. SINNOTT, ESQ., ROSEMONT, PA. MESSRS. HAZLEHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

WASHINGTON



APARTMENT-HOUSES AND HOTELS. — THE PORTLAND, THE RICHMOND, THE MALTBY, THE NORTON, THE ERBITT, WILLARDS, THE ARLINGTON, ETC.

SOME eight or nine years ago the first apartment-house or flat-building was erected in Washington. It was an innovation as an investment, and I heard many business men express doubts as to its being a paying investment in a city where there was still an

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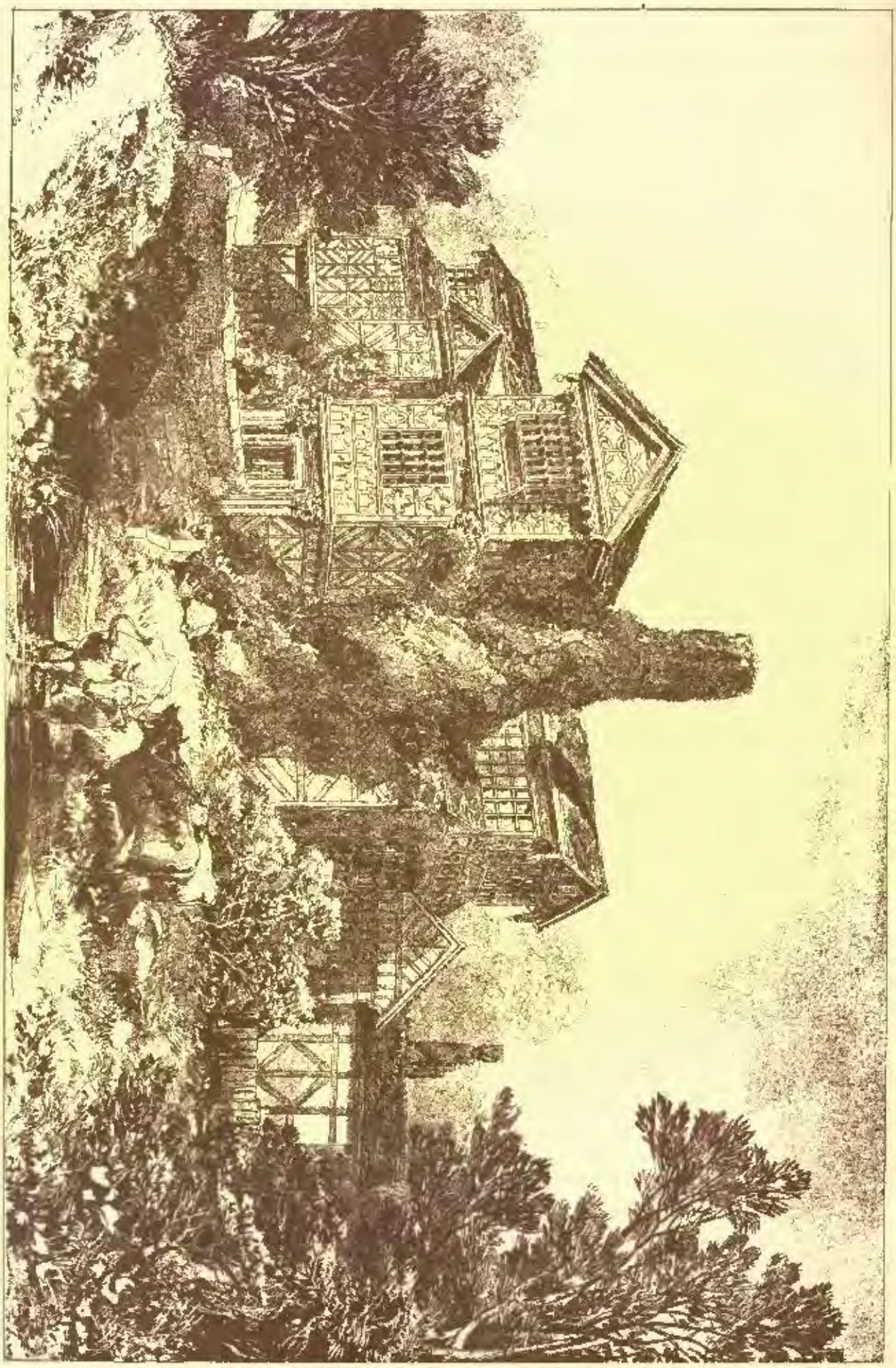
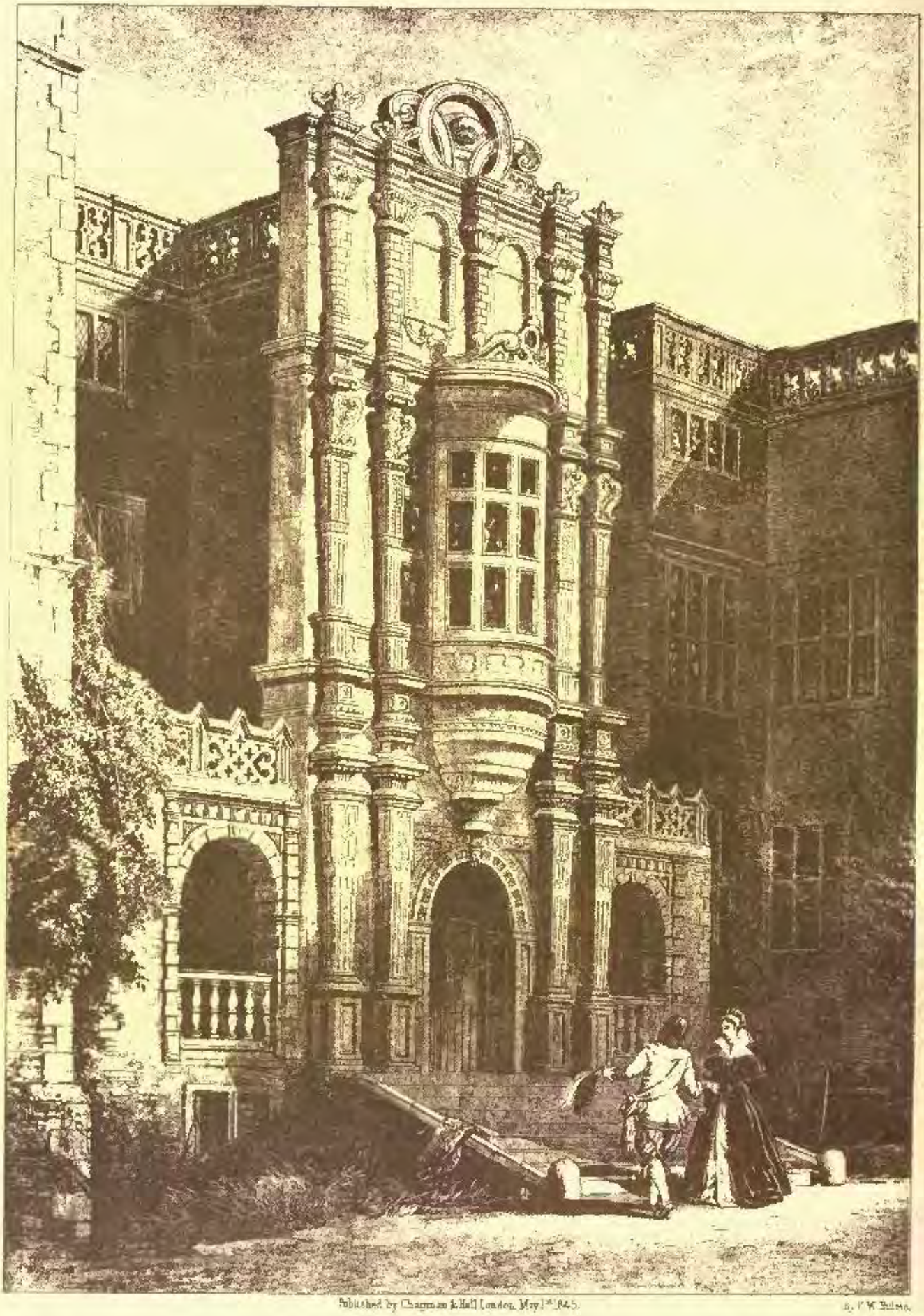


MOUSTON HALL, CHESHIRE.

Published by Chapman & Sal Gardner Sep. 1 1884

Ironi & Sitetch by Henry L. Pratt



Published by Chapman & Hall London, May 1st 1845. E. W. Brayley

BRAMSHILL, HAMPSHIRE.

PART OF TOMB OF CAN SIGNORIO, VERONA, ITALY

MONUMENT TO THE DUKE OF BRUNSWICK, GENEVA, SWITZERLAND

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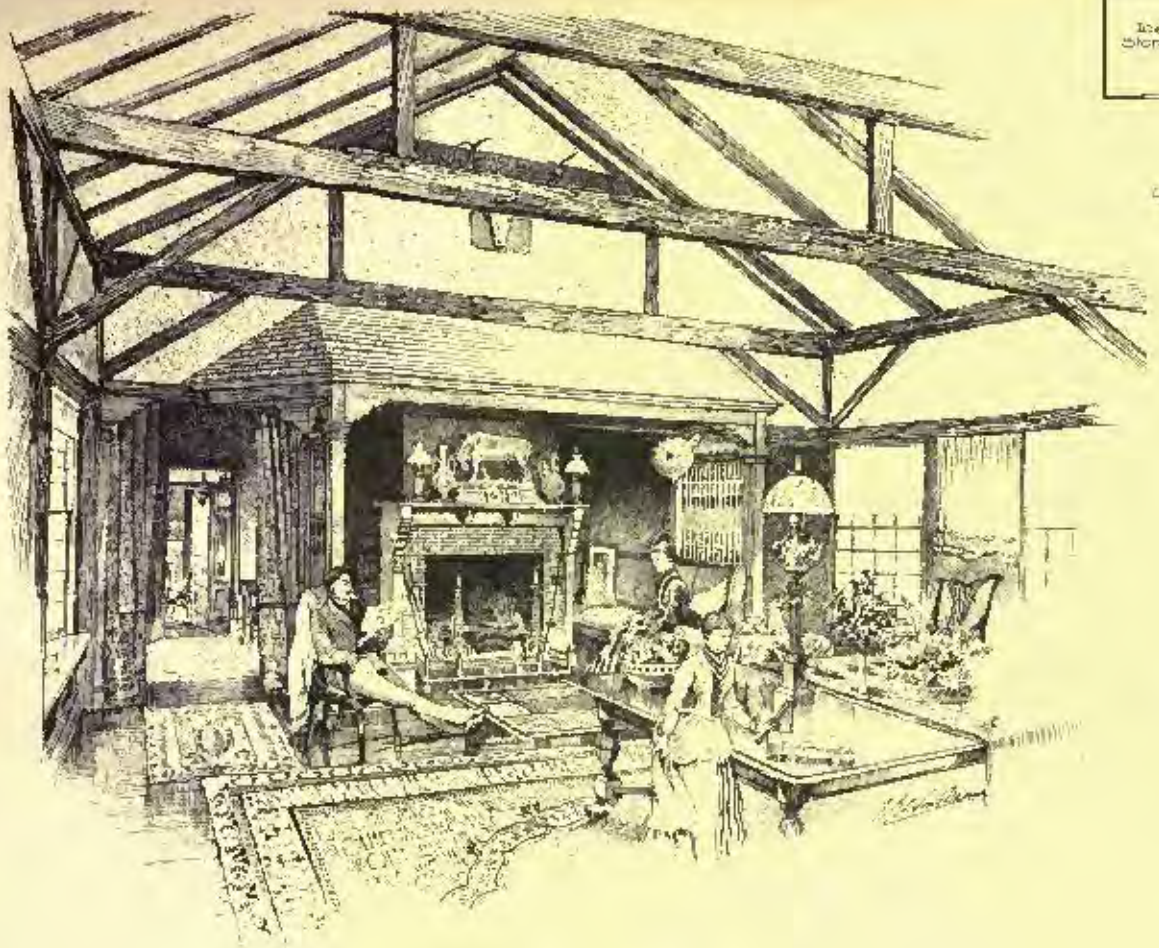
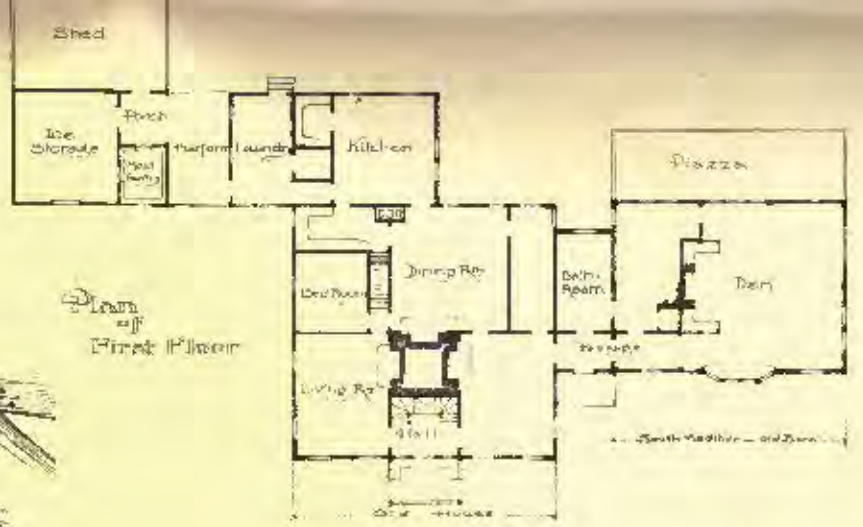
Residence of M. George M. Jones
Greensburg, Pa.

J.A. Dempwolf, Archt
York, Pa.



Interior of Den



Plan of First Floor

The old Homestead

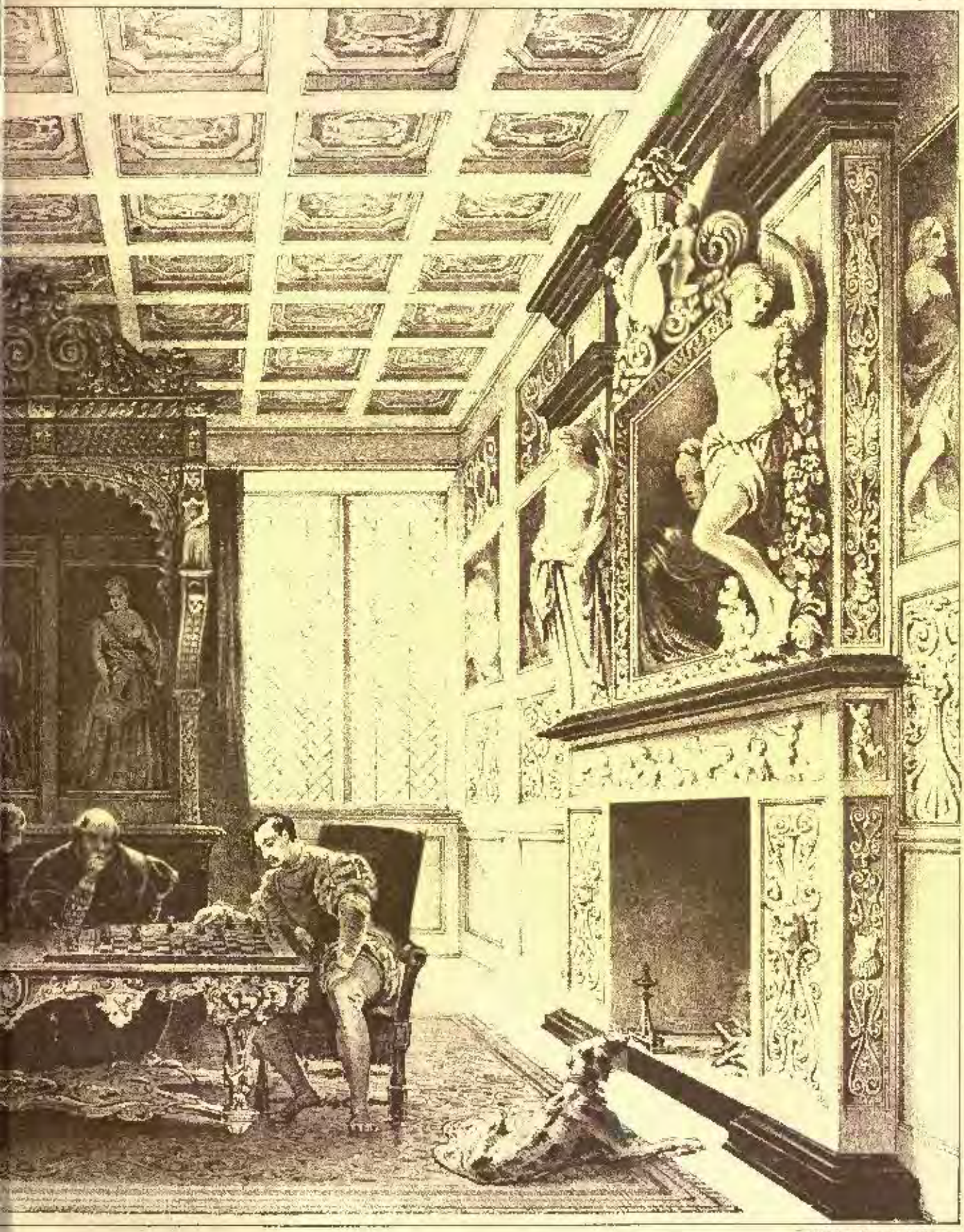
Sketched from Photos.

Heliotype Printing Co. Boston.

SKETCHES · OF · THE · A

· DINING-HALL ·

Pl. 8.



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GE · OF · FRANCIS · FIRST ·

ENONCEAUX ·

General View showing old House & Additions

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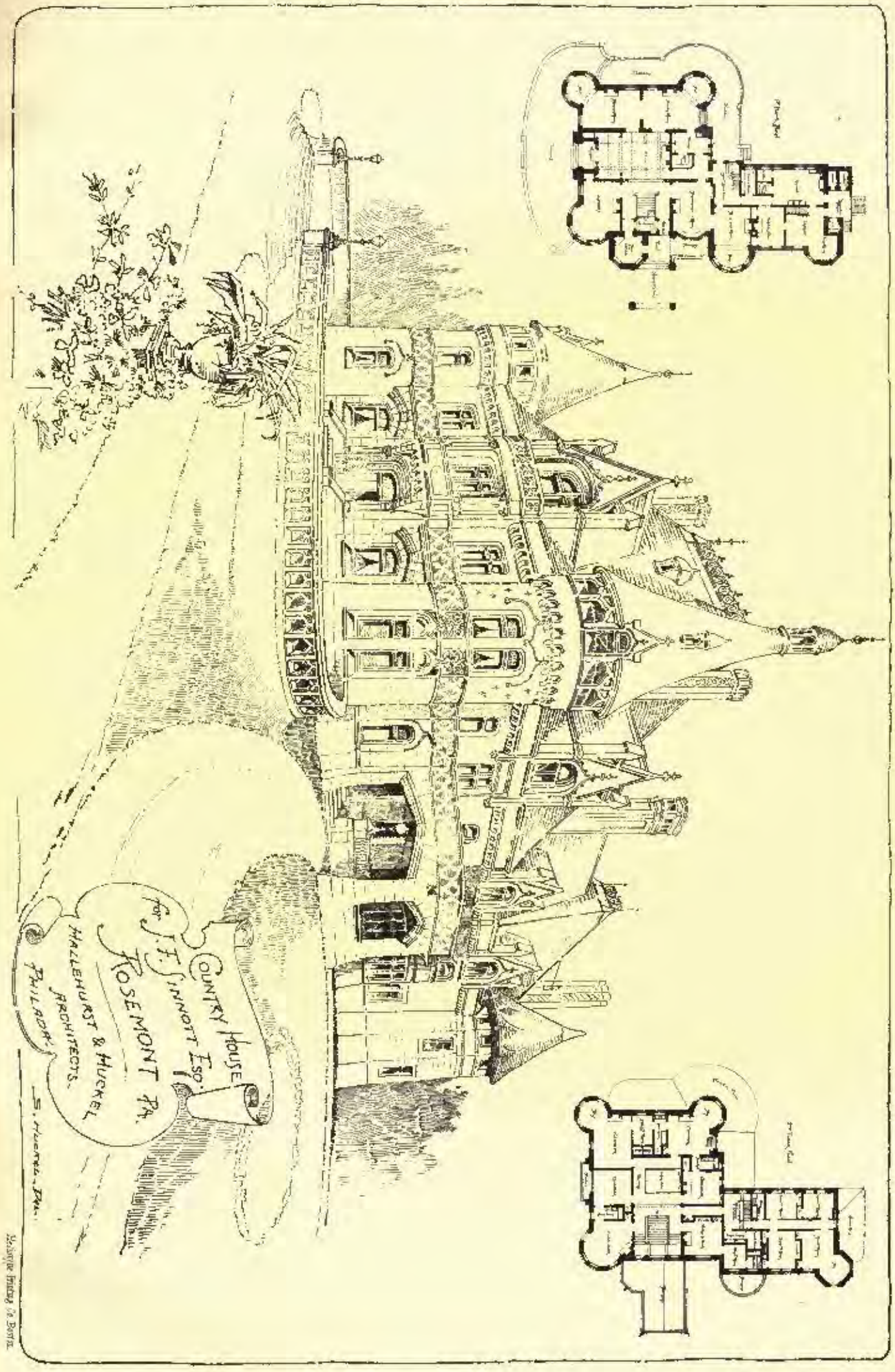

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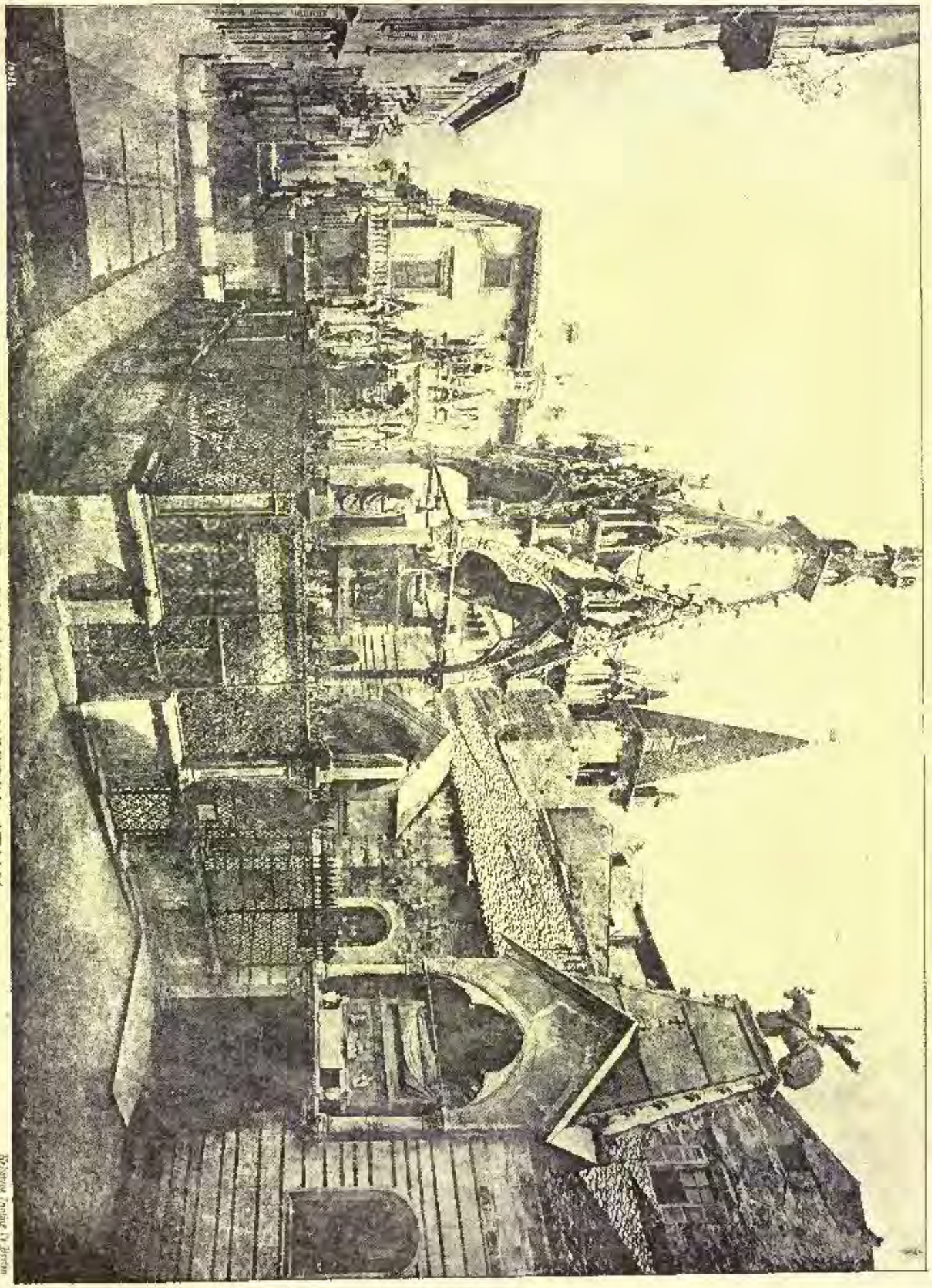
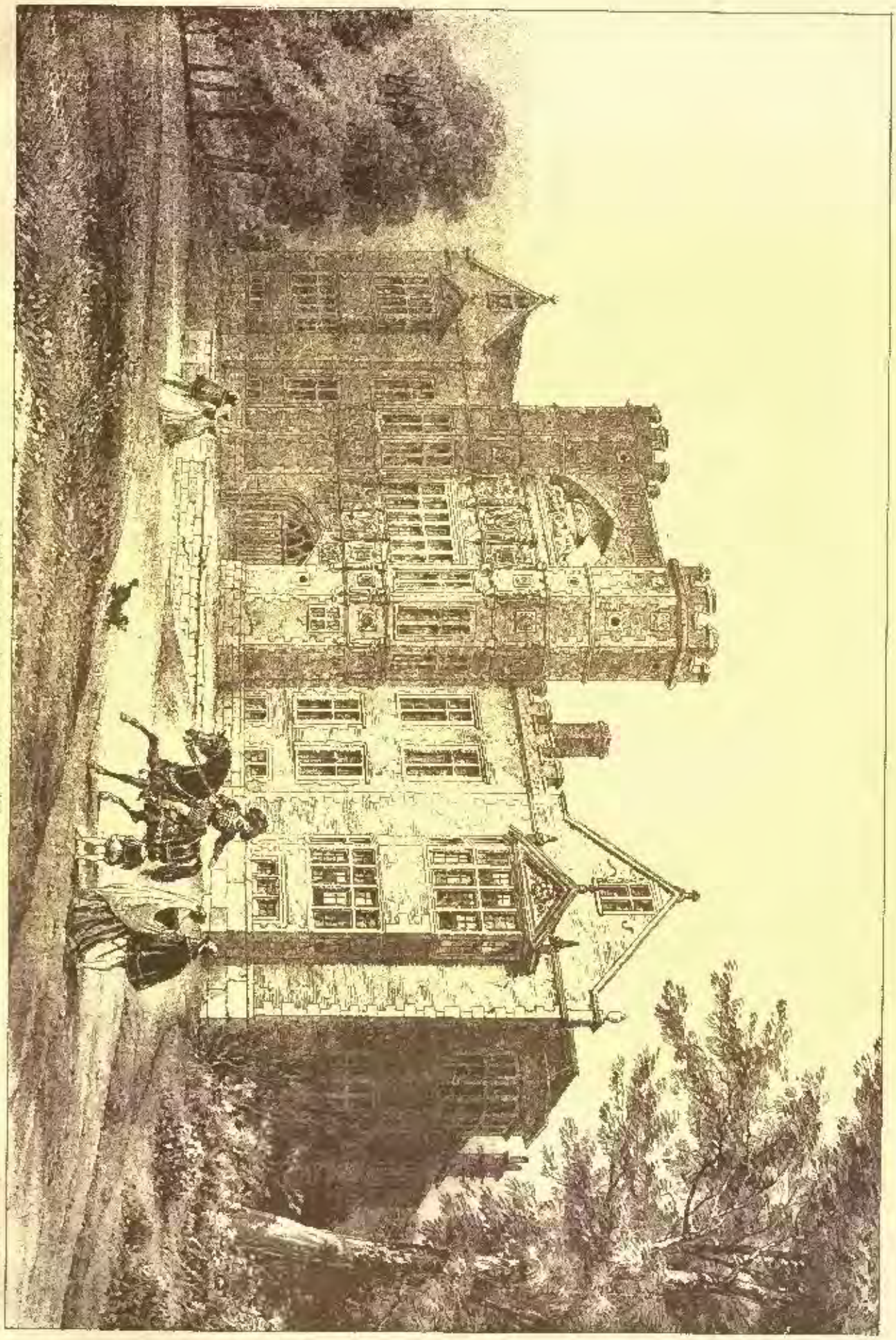


TOMBS OF THE SCALIGERS, VERONA, ITALY.

Heliotype Printing Co. Boston



DARRETON HALL, CHESHIRE

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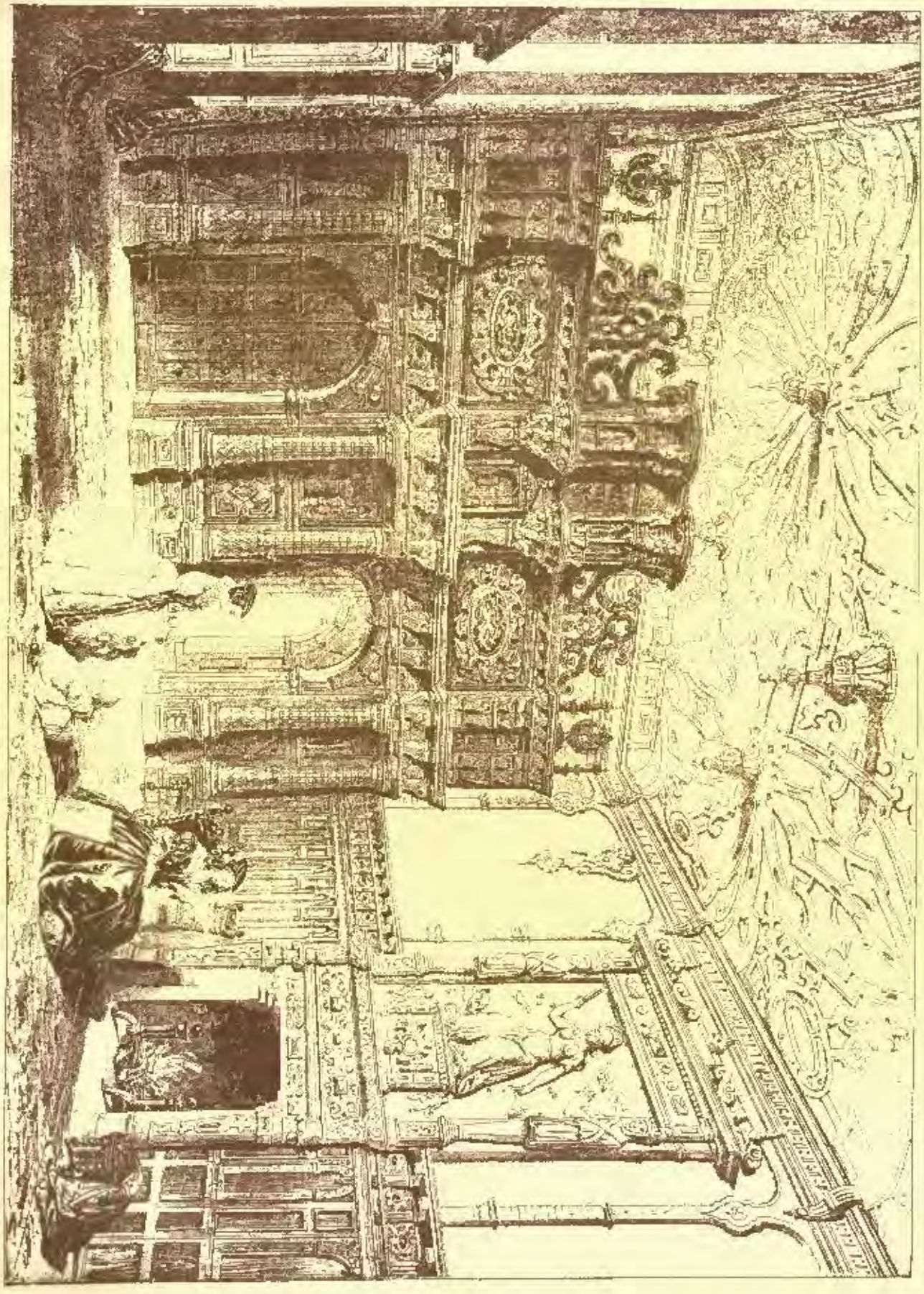

Photo. & Sketch by C. F. Richardson.

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HELIO-CHROME.

HELIOTYPE PRINTING CO., BOSTON.

UPPER PART OF EXTENSION TO ADAMS HOUSE, BOSTON, MASS.

W. WHITNEY LEWIS, Architect.

abundance of ground available for separate dwellings. This first apartment-house called "The Portland" was designed by Messrs. Cluss & Shultz. On the exterior it is brick trimmed with large galvanized-iron window heads and cornice. It is excellently arranged inside for its purpose. All the rooms are well lighted being on one of the acute-angled corners so common in Washington at the intersections of avenues and streets. It has entrances both on Vermont Avenue and Fourteenth Street. Its construction is fireproof, the joists being iron with terra-cotta arches sprung between them and the principal partitions, if not all, are of terra-cotta.

"The Richmond Flats," corner 17th and H Streets, were built five or six years later from drawings made by the late Mr. Carl Pfeiffer of New York. Its exterior is very artistic and pleasing. The basement and first story are of Hummelstown rock-face brownstone. The other portions of the building are of brick trimmed with the same brownstone. The whole is capped with a large steep roof of red tile broken by quaint wooden dormers. On the corner of 17th and H Streets a circular tower starts at the street and rises to some distance above the roof-level in a slender, tapering and effective tile roof, capped with an open belvedere. In style the building might be called a free treatment of Tudor Gothic. When this building was first erected, considerable dissatisfaction was expressed at the lack of light in some of the rooms and halls. Last year an addition was made to this apartment-house on the H Street side, when possibly these defects were remedied. It is a pity that this building was not erected with fireproof construction. The interior framing is with ordinary wooden joists and stud partitions. These two buildings have demonstrated the fact that apartment-houses are a paying investment in Washington, at least in fashionable localities.

"The Maltby" designed by Mr. Robert Stead, was completed in the early part of this year. It is finely situated at the intersection of New Jersey Avenue and B Street, N. E., and overlooks the Capitol Park. From its upper windows a fine view of the broad Potomac River can be obtained. Its exterior is of brick, simple, but effective. The roof-line is somewhat marred by the ogee curve given to the corner tower roof. This is different from the form of the roof shown on drawings published before completion, and was caused by an incongruity in the District Building Regulations, requiring everything above a certain height to be of iron construction no matter of what the lower portion is built. The lower twelve or fifteen feet of this tower roof could have been built of wood and the upper six feet built of iron. To avoid, possibly, an "extra" the roof was kept lower than was originally intended as the Building Inspector had ordered iron above a certain point.

Decidedly the most pretentious apartment-building in the city is "The Morton Flats" now in process of erection on H Street and 15th. It is owned by Vice-President Morton, and was designed by Hubert Pirsson & Co., of New York. The exterior is poor in design, lacking in dignity and repose, for such a large building and one so costly. Its cost is, I understand, between $250,000 and $300,000. The first two stories are of a light colored stone, above it is of brick and galvanized-iron. This easily worked sheet-metal is brought into service for belts, oriel windows, cornice, finials, dormers, and verandas. Its details are bold and obtrusive, stamped and molded metal being used with almost unlimited liberality. Although this building lacks in dignity and refinement it gives one the impression that it is determined to assert itself by its mass and overloaded tawdry finery. It is framed with wooden joist protected by a concrete of stone, ashes and cement, and hence it is called fireproof.

"The Woodmont" on Iowa Circle, is an apartment-house formed by [with additions] a combination of private dwellings. The exterior is entirely lacking in architectural effect, and the interior shows an effort to adapt rooms to uses that they were never intended to serve.

The apartment-houses described above have elevators, cafés, kitchens, and other conveniences called for in modern houses of this character.

There have been built a number of smaller flat-buildings in the last year without such conveniences. The only one worthy of mention being "The Frederick," by Mr. J. G. Hill. It is simple and refined in design, the first floor being used for stores and the three upper floors as apartments.

Washington is very much in need of a first-class hotel, not from the upholsterers' and caterers' standpoint, but from the architects' point-of-view. The hotels, with one exception, are all old buildings, built years before the War, or a combination of old hotel, old dwelling-houses, new additions and alterations. "Willard's," "The Ebbitt," "The Arlington," and others have this history. They have grown gradually as their custom demanded. It makes their exterior and interior one mass of incongruities: low ceilings where there should be high ones, stairways and steps where you would least expect them, insignificant staircases suitable for medium-size dwellings where you would expect a grand hall and stairway, odd, crooked and unexpected halls, poorly lighted and ventilated rooms and an enormous amount of combustible material ready in case of a fire. But the many curious necessities of such a growth can be easily imagined by any architect. The National and Metropolitan Hotels were built as hotels, but they are not up to the modern acceptation of the term. The Hotel Normandie, finished at the beginning of the present year, is well arranged in the interior, with all modern requirements of a hotel. The exterior seems to have been designed from the dwelling-house standpoint. The entrances, windows, treatment of projections and other details convey the impression of a number of very tall, elongated dwellings. It fails to give any idea of its purpose and is devoid of unity. "The Arlington" has commenced the erection of another extensive addition to cost about $150,000, from plans made by Harvey L. Page. From newspaper accounts the front is designed to conform with the front of the old building, — a monotonous, flat, brownstone front pierced by numerous small windows, and topped-off with an ugly mansard roof. The addition will be probably nearly as large as the present hotel.

The large building, well-planned, well-designed, well-constructed, well-lighted, well-ventilated, with proper stairways, halls, and other modern conveniences in the hotel line is still a thing of the future so far as Washington is concerned.

There have been many rumors that such a hotel would be built in the near future, but they are apparently only rumors.

CANADA

THE GROWTH OF TORONTO. — "JUSTIFICATION" PLEADED TO A LIBEL SUIT. — STREET PAVING. — PAVING IN TORONTO AND MONTREAL. — THE CANADIAN ROYAL ACADEMY. — ART ASSOCIATIONS.

THE City of Toronto is at present in a state of transition from boyhood to manhood — from a village to a great commercial centre — the greatest commercial centre of the Dominion. At the beginning of this decade the population numbered about 100,000, and it was then exactly an English county town, not of the manufacturing kind, but more like the cathedral cities, without, however, the prominence of the cathedral and its adjuncts. The streets, mostly avenues of shade-trees, with grassy margins to the roads, the houses of the gabled-villa style, and the shops of small three-story buildings, as a rule, its warehouses pokey and dingy, and not up too much. But though its appearance was that of a cathedral town, there was none of that delicious sleepiness and quiet about the movements and doings of its inhabitants that characterize these places, and to-day we see the result of the steady progress that was quietly proceeding, only outwardly manifested by the continual growth of private houses. The population now close on 175,000, of whom, at least, 20,000 are dwellers in their own houses, is of the most go-ahead kind, and progress is the watchword of the day. A by-law has recently been passed by a large majority of freeholders, to enable the city to raise $600,000 towards the erection and completion of the Court-house and City-hall building, in addition to the sum already in hand, which brings up the total cost of the building to a million-and-one-third. This building, together with nine other great blocks now in hand, or for which contracts are now being let, brings up the amount being laid out on these ten buildings to nearly four-and-one-half millions of dollars; and, in consequence the streets present a curious appearance, a six-story building stands next a three-story, adjoining which is a frame tenement a story-and-one-half in height. A little inn will be suddenly transformed into a great hotel, and the occupants of a tumble-down, cranky-looking club-house emerge from their obscurity and take possession of a miniature palace. Vacant land existing is not sufficient for its spreading energies, and a slice has to be taken off the Bay and turned into solid ground for the accommodation of its railway systems, while at another part water-meadows are being reclaimed and transformed into building-lots for warehouses and factories.

There is one little matter that bothers both people and Corporation extremely, and that is the material for road-paving. A libel suit has just been decided in favor of the defendant who put in a plea of "justification" on the subject of cedar-block pavements. The defendant was the proprietor of a daily paper, and courageously attacked the system under which the block-pavings were laid. This naturally resulted in a libel suit, the contractors being the plaintiffs, but the plea of justification saved the defendant, and a great victory was gained for the ratepayers over maladministration of the City Engineer's Department. As one of the immediate results, the contractors have petitioned for an additional price, declaring it to be impossible to obtain the wood of the quality specified for the figure named in their accepted tender and contract. These block-pavements are simply short cedars laid on end, and the interstices filled-in with gravel. They form fine receptacles for ordure and dirt which naturally sinks into the vertical fibres and pores of the wood, while frost or heavy rain causes them to rise sometimes completely out of the ground, at which times the block-paved streets are worse than corduroy-roads. A kind of asphalt, laid in blocks a few inches thick, has been tried, but has not been a success, and now a few streets are to be laid with asphalt, floated on hot, and in a liquid state, which, while new, makes a beautiful roadway, but it is doubtful whether it

will stand heavy traffic. It has been successfully tested as to the effect of frost upon it, and appears not to be injured at all by the weather.

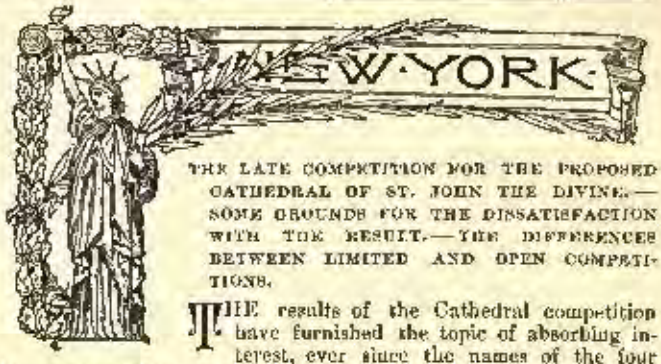
Montreal, for many years, has been content with the old-style macadam-roads, and the innocence with which the Corporation went on laying down this kind of road and repairing them with cart-loads of stones dumped over holes, left to be levelled and trodden in by the ordinary traffic was worthy of the Middle Ages. Some streets are paved with granite setts, to the fearful distraction of thoughtful people who inhabit the offices on either side of street, but asphalt has been introduced and successfully experimented on in one or two streets.

People are always attempting to compare Toronto and Montreal — a very impossible feat — for as I have remarked before, the two cities are of an entirely different nature. But there is one point which is very characteristic of the cities, and upon which a comparison is possible and legitimate. I have already alluded to it with regard to Toronto. It is that while Toronto with its population of 175,000, has 20,000 people living in houses they own themselves, Montreal, out of its population of 200,000, has only 11,000 dwellers under their own roofs. In Montreal private wealth is concentrated; there live Canada's millionnaires, Canadian Pacific Railroad magnates, while in Toronto, where there is, I believe, but one solitary millionnaire resident, money is far better distributed. This affects individuals, and has no reference to companies and societies. Canada is not often visited by such calamities as so unfortunately occur so often in the United States, and on such a scale there as to have almost become proverbial throughout the world, and it is some time since we have had any great conflagration. But the recent fire in St. Sauveur, a suburb of Quebec, described in detail in the daily press, has proved just such another example of the proverb concerning shutting the stable-door when the horse has escaped, as is so frequently to be met with on this continent. No water-supply until we are all burnt out and our houses levelled to the ground, and then the Corporation instantly sets about a water-system which it would never have dreamed of but for the fire. But all disasters pale before the awful calamity of the Conemaugh Lake. A water-spout, a part of the same storm which burst the dam, swept away a part of the small town of Cobourg, on the north shore of Lake Ontario, doing half-a-million of damage, and destroying the lives of about a dozen people.

The fine arts are being practised and encouraged just now in Canada, as they have not been heretofore. Art-schools and art-associations are springing into existence everywhere, while both the Government and corporations are giving encouragement to sculptors by orders for statues of public men. A great deal more might be done than is at present, and the fine arts do not receive the encouragement they deserve; but that is a thing that will come; a country has to be educated to the appreciation of art, and to the knowledge that the fine arts are necessary to it for its thorough civilization.

The Canadian Royal Academy, whose headquarters are at Montreal, has, unfortunately, admitted into its membership men who are not artists proper, who have very little spark of the artist in their composition, as well as a few who are not artists in any sense of the word, who do not even understand the first principles of art, but, who from one cause or another, take a passing interest in art-subjects sufficiently strong to make them subscribe the small admission subscription. It has thus become a kind of mongrel society, the result of poverty, which, in the desire to accumulate funds, caused the promoters of the association to admit "artless" men. The disadvantage to the association shows itself principally in the working of sub-committees, upon which often these inartistic members get seats, and the result of the deliberations is often — as indeed, one could only expect — very distressing to artists. The small gallery at Montreal is hard to keep up, but the Academy does itself really more harm than good by admitting such men to full membership. A recent photographic group of about a dozen members of "R. A.'s" contains, at least, two figures who know about as much about art as an ordinary stonecutter. Patience is a hard thing to practise, but it is patience alone which will make a success of art-associations in a new country. The President of the Academy, who has a very fine gift for landscape-painting, Mr. L. R. O'Brien, has gone to England for the summer to make further studies of English country-scenery. He has recently had on view a collection of his paintings of views in the Rockies, made during a tour there last summer.

The Ontario Society of Artists is nowholding its seventeenth annual exhibition of paintings, and it is wonderful to see how greatly and how rapidly art is progressing in Canada in the hands of students; if only the wealthy could be induced to patronize art to a more genuine extent, we should soon have an Academy to be proud of. It is not the talent that is wanting nor the will to study for its development, but its development depends entirely upon the encouragement extended to it by the public. No greater mistake was ever made than when customs-duties were imposed upon works of art. Our students need examples badly for their study.



THE LATE COMPETITION FOR THE PROPOSED CATHEDRAL OF ST. JOHN THE DIVINE. — SOME GROUNDS FOR THE DISSATISFACTION WITH THE RESULT. — THE DIFFERENCES BETWEEN LIMITED AND OPEN COMPETITIONS.

THE results of the Cathedral competition have furnished the topic of absorbing interest, ever since the names of the four chosen competitors were wormed out of an apparently unwilling committee by the omniscient, irrepressible newspaper reporter.

There has been in the profession a very general feeling of surprise, not unmixed with disappointment, that in a competition of such importance and fraught with such far-reaching possibilities for good or evil to our art, the prizes have gone to men, for the most part inexperienced and unknown, or known only as clever draughtsmen. And this whilst others, of wide experience and tried ability are known to have taken part in the competition.

This unexpected result, together with a certain air of mystery that has seemed to shroud all the the details of the programme and all the acts of the committee, has inspired an amount of newspaper comment and criticism, that, whilst in a way flattering, as seeming to show a wide popular interest, has been on the whole unfortunate, for it has tended to befog the real issues, has given our zealous correspondents a chance to air their grievances or their hobbies and has disseminated a deal of misinformation which not always being pertinent came perilously near at times to being impertinent. As for instance, an article published while the drawings were in the hands of the committee, and before they had had time to come to any conclusions, which in an ex-cathedra manner took up the cudgels in favor of a certain style and a particular disposition of plan. This article, or editorial was, without a doubt, honestly and innocently written, it showed more than a passing familiarity with architectural styles, and was both earnest and readable, but in spite of the absence of intention to offend, probably much to the writer's surprise and disgust, it had, and it seems to me rightly, to many readers the appearance of an attempt to influence the minds of the jury, as had also the doubtless equally innocent publication in one of our dailies, of a reproduction of one of the competing designs, with appropriate reportorial elucidation.

After the names of the four selected competitors were made public, the newspaper comments took an even wider range, and all the picturesque aspects of the contest were brought out and made the most of. Without a shadow of reason, without an atom of reliable evidence it was affirmed or insinuated that all the participants were ignorant or biased, while little or nothing was brought out tending either to explain the feeling of disappointment that existed very generally, or to remove it.

To-day that feeling still persists in all its force and I should not be surprised if it had even infected the committee itself, and made the gentlemen who compose it, feel, individually and collectively, that it might be an open question whether the great outlay of talent, of time and of money on the part of all concerned, was destined to produce commensurate results.

There is one factor, as far as I have been able to see, that more than any other single one has tended to bring about the present state of dissatisfaction and that is the action of the architects most immediately concerned. I mean the originally invited competitors.

In order to point out what seems to be the weakest link in the chain, I shall have to go back to the first steps taken and follow the competition through all its stages, and I would say here that I put forward my arraignment of the profession in all diffidence, having found the greatest difficulty in getting reliable information upon many important points.

It was generally understood when the programme was first sent out, that Professor Ware had drawn it up, and this I have no doubt influenced the invited competitors not to cavil at conditions which might seem unwise to them, but which were new and untried and therefore not proven to be bad.[1] It was most unfortunate, whatever the reason, that the programme was not thoroughly discussed by the invited architects and its provisions weighed, and where found wanting their objections and the reasons for them brought to the notice of the committee. The members of the committee are not only exceptionally intelligent and fair-minded men, of the highest standing, but they showed in the programme an evident desire to make every reasonable concession to the architects, in order to secure the best possible results. They were hampered, without definitely realizing it, by not knowing exactly what kind of a cathedral they wanted (how far to carry the compromise between church traditions and modern innovations) and still more by finding in architectural practice no definitely developed rules for the conduct of competitions, and no consensus of opinion on the subject amongst such of the architects as they sought

[1] It transpired later that Professor Ware while discussing with a member or members of the committee the conditions of competitions in general was in no wise responsible for the programme of this competition in particular.

guidance from. The resulting programme seems to have been a patch-work of entirely good but partly irreconcilable conditions.

The first of these difficulties, while forcing them to leave their instructions vague in important particulars, was unavoidable, and seems to have been judiciously met by the proposed selection of four equally favored designs. The other difficulty should have been remedied, it seems to me, by concerted action on the part of the invited competitors, who had a splendid opportunity to render a most valuable service, the good influences of which would have been felt in all future competitions. A protest against such of the conditions as seemed objectionable would, if properly undertaken, have increased the respect of the community for them and for their profession, while the present status is harmful to us all, and diminishes our power for good.

Of course, whether it is an unloaded gun, an innocent live wire or a subway man-hole, it is much easier for the onlooker to explain the case to the coroner's jury, than for the victim to profit fully by his past experience. One cannot say, "I told you so," or use the *ex post facto* argument in any form without feeling a little mean, and my only excuse for doing it now, is that the weaknesses I see now, I did not see before, and they are not isolated instances but part and parcel of our development as a profession. The full discussion therefore of any short-comings there may be in the competition, one phase of which has just been watched by us all, will help to clear the way for more intelligent future action, whether this particular complication ever recurs or not. The programme for the Cathedral competition seems to me to be fatally defective in the following particulars:

First. In trying to unite a paid competition amongst invited competitors, with an unpaid competition open to all comers. Either one may be brought to a successful issue, but only under entirely different conditions. In the former the selection of a certain limited number of competitors presupposes that any one of them would become the architect of the building to the satisfaction of those inviting him, and that his work or his attainments have satisfied them upon that point. All the competitors start fairly and equally and the sending of designs under a cipher is meant to continue that fairness and equality up to the moment when one competitor is chosen. There is no more reason in such a competition for holding a public exhibition of the designs than for chusing the competitors by public ballot. A public exhibition after the selection of the design or the award of prizes is interesting and justifiable in the case of quasi-public buildings.

In the other, the open-to-all competition, there is no guaranty whatever that the originator of the design selected will be qualified to undertake satisfactorily all the duties of architect. The design may be the unquestioned best, the indications of construction, or the estimates, or specifications may be all that could be desired and yet the designer himself not satisfy the requirements of the responsible committee: whether it be his youth or inexperience or the color of his hair, they will not and should not be asked to accept him, unknown and unsought by them, just because after a careful comparison and a full opportunity for investigation they have chosen his design. The open competition, naturally, if its conditions are fair and the prize important will be liable to attract a large number of competitors, a large proportion of whom will be comparatively young and inexperienced. If everything is fair the chances are in favor of a certain number of unknowns being chosen. The public exhibition before the award in such a case would seem to be a most excellent safeguard against the dissatisfaction which is otherwise almost sure to develop in some quarter. I am assuming that the open competition we are discussing is for a building of sufficient importance to attract public attention. If the public interest centres on one or more of the designs, their preference is worth knowing and weighing, if it does not, that fact alone makes any general complaint impossible. The cipher is of but little use where there is a public exhibition as the favorities are sure to be known, on the other hand, it is not nearly so valuable a safeguard as favoritism is much less to be feared in the face of public comment.

The building cannot, in an open competition, be unrestrictedly given to the author of the successful design, and that is the weak point of such competitions in this country where there is no recognized standard of professional proficiency. Perhaps safeguards could be elaborated, such as examinations or the right to associate another and qualified architect with himself, which would make it reasonably safe and sure to appoint the successful designer.

Second. The pledging of the committee not to exhibit the designs without the consent of all the invited competitors. This question should not have been left open, but should have been settled by the common action of the architects themselves before getting to work. As it is, being, I believe, about equally divided, both sides feel that they are hardly used. Whether to exhibit now or not is, as I have indicated above, dependent upon the other conditions. In this instance it has certainly been unfortunate and the direct cause of much of the dissatisfaction, that the committee have felt that they were pledged, until relieved by the unanimous action of the invited architects, to the profoundest reticence as to all their actions. So that a great competition in which every intelligent person was interested has been and still is shrouded in mysterious gloom.

Third. There seems to have been an intention on the part of the committee to get from the architects the slightest sort of sketches giving motives only with but a hint of detail, and from amongst these to select a limited number for further elaboration. This intention, as I say, was obvious, but it was not made binding and there was plenty of time; the result was that each competitor used all the time he could, feeling sure that some at least amongst them would have carefully worked-out drawings and not wanting to be left at too great a disadvantage in point of rendering. An architect could have made this part of the programme so as to obtain more equal results, and consequently a fairer chance for comparison. The moral of it all is, that we should all of us put our shoulders to the wheel and not spare ourselves; whenever we have a chance use it to bring about collective and united action in such direction as seems best. Let us act through the Institute, the Chapter, the League or through fortuitous groups brought together through the prospect of engaging in competition, but let us always act together.

With full liberty of discussion, in constant intercourse with men of the most diversified callings, in a quasi-judicial position between our clients and their contractors, we are in no danger of becoming narrow and can surely, if slowly, build up that necessary body of traditions and precedents which will be recognized and accepted by the public as soon as we learn to live up to them ourselves.

EQUESTRIAN MONUMENTS.[1] — XVII.

Statue of Francis I, Prague, Bohemia. Kranner, Sculptor.

ABOUT all that is known of the equestrian statue of the Emperor Zeno which once crowned the Palace of Theoderic, the foundations of which to-day bear the Castel San Pietro at Verona, is that it was so large that pigeons flew through its wide-distended nostrils to their nests in the belly of the horse. But Verona claims attention here not by reason of what is no longer there, but because it possesses a famous group of sepulchral monuments which bear equestrian statues and which are the type of a small number of similar structures of a later day which may be considered together with them.

Crowded together in a little square at the side of S. Maria Antica, enclosed within a high grating of exquisite trellis-work in wrought-iron, interwoven in which are innumerable small ladders — the symbol of the family — stand the monuments of the Scalas, for more than a century the rulers of the territory. Descended from a plebeian ancestor named Villani, who made a fortune by dealing in ladders, the family boldly avowed its origin, adopted the ladder as its token and is commonly known in history as the Scaligers, or ladder-bearers. The tombs of the earlier members of the family are lowly in form and unpretentious in design, but like the actual sarcophagi of the more elaborate monuments their sides bear in very low relief sculptured scenes of not a little artistic value. It is not unnatural that

[1] Continued from No. 702, page 272.

the first one of imposing character should be that of the most noted member of the family, the famous Can Grande, who was not only a capable leader and ruler but also a patron of the arts and as such deserved the monument erected to his memory, a monument which Ruskin characterizes as the "consummate form of the Gothic tomb." This monument [1329] is built over the entrance doorway to the little graveyard and in design sets the example followed by the two other equestrian monuments of the group by representing the prince both in life and in death, for above the recumbent figure which lies upon the sarcophagus is reared a steep-pitched canopy upon the summit of which is borne the more than life-size equestrian figure of Can Grande, with his winged helmet slung to his back. There is a well-studied simplicity about this monument which makes it stand out in agreeable contrast with the florid exuberance of the latest of the three monuments, the one which Can Signorio caused to be erected during his own life-time and, after the manner of Louis XI of France, who as a safe-guard against future torment used to wear about his hat a band of leaden saints, adorned the structure with the effigies of saints and virtues whom he had totally disregarded during his life. The tomb of Mastino II [1351], by Perino of Milan, stands between these two both actually, chronologically and as a matter of art; like the others it is crowned with an equestrian figure on the summit of a canopy which shelters the recumbent effigy of the prince. It is one of the commonest features of life in all times that the founder of a family, the gatherer of wealth, the respected member of society of his time should be succeeded by a degenerate son whom the surroundings of his childhood's home have prevented from acquiring the steadfastness and ruggedness of character which less favorable circumstances — as the world calls them — engendered in the sire. Such an observation might be made with reference to Mastino II, although he was not the immediate successor of Can Grande. The possessor of a larger income than was enjoyed by any potentate of the day, it was not unnatural that Mastino should be able to procure the pleasures which wealth, power and the lax morality of the Italian society of the day placed within his easy reach. Success in the lists of love, which he was prone to enter at every chance, secured him many enemies and involved him in many contentions which caused the loss and absorption of much of his wealth and power, so that though his court was the largest and most famous for the rank and quondam power of its attendants — at one time there were not less than two-score dethroned princes who had sought haven at his court — the reckless license of his life had greatly diminished the patrimony which passed on to his successor Can Signorio. Still Mastino was in many ways an able ruler and the internal condition of the Veronese territory never before touched so high a mark, and if it is ever proper to commemorate the existence of a ruler without scrutinizing too closely the moral propriety of so doing, Mastino has certainly as good a right to his monument as had the Duke of Brunswick, and better than Can Signorio who had such becoming doubts as to his own worthiness being recognized by posterity that he found it desirable to erect his monument during his own lifetime. Of the entire group, Street says: "What either Cologne, or Ratisbon or the Wiesen Kirche at Soest is to Germany, the Choir of Westminister Abbey or the Chapter-house at Southwell to England, Amiens Cathedral or the Sainte Chapelle of Paris to France, that is the Cemetery of the Scaligeri in Verona to Italy, the spot, that is, where at a glance the whole essence of the system of a school of artists may be comprehended, lavished on a small but most stately effort of their genius."

Of the monument of Can Signorio by Bonino da Campione, the latest [1375] and most elaborate of these monuments, Street says he is "afraid it is the most commonly admired." By one man, at least, who was able to give expression to his feeling, it certainly was admired. When the will of the exiled Duke Charles of Brunswick, who for three years had found a home in Geneva, was opened, in August, 1873, it was found that he had bequeathed his large wealth to that city on certain conditions, one of which was stated in the following terms: "It is our will that our body shall be deposited in a mausoleum raised above the ground which shall be erected by our executors at Geneva in a prominent and dignified position. The monument shall be surmounted by our equestrian statue and surrounded by those of our father and grandfather, of glorious memory, after the design attached to this testament, in imitation of the tomb of the Scaligers at Verona. Our executors will build the said monument in bronze and marble by the hands of the most eminent artists, using as many millions of our estate as may be necessary."

Here, then, was a man who since he was deposed in 1830 in favor of his younger brother had travelled widely and frequented cultivated society, yet selected the tomb of Can Signorio as the one of all others he would chose as a model for the resting-place for his own ashes. The selection of the model is almost as much a mystery as his reason for bequeathing his wealth to a city with which he had but a short and chance connection. Perhaps the first mystery can be explained by the supposition that he saw that the execution of a similar monument offered a grand chance for consuming a vast amount of money — and so preventing his municipal legatees from misspending too much of its bequest. For the second mystery no better solution has ever been offered than the tale that once when he was visiting the Cathedral of St. Pierre in Geneva, his attention was attracted by some well-preserved monuments which, he ascertained, had been in existence for hundreds of years. This information is surmised to have suggested that here was a peace-loving community who, without its being particularly made worth their while, yet preserved monuments for hundreds of years, and that here, therefore, was just the place where one who was thinking of perpetuating his name by a post-humous monument might hope for its longest survival — particularly if a bribe were judiciously administered. The whole affair looks like the act of a vain and rather foolish man.

Otho I in the Market-place, Magdeberg.

Be this as it may, the city accepted the bequest and placed the work of erecting the monument in the hands of M. Jean Fraud, architect, who carried it out to a scale one-fifth larger than its model. He secured as his assistants: M. Cain for the equestrian statue, the lions and the chimeras; M. Iguel for the sarcophagus and the bas-reliefs, and MM. Thomas, Millet, Schuenewerk and Riesling for the statues of the Duke's ancestors; M. Topffer for the medallions, and M. Custer for the rest of the work.

Except in the matter of scale, the modernizing of some of the detail, and the individualizing of the sculptures so as to have application to the Brunswick family, the structure at Geneva is a close copy of the one at Verona, almost the only effort at originality being the introduction of the lions and chimeras as auxiliaries, and the way in which basins of water of different shapes and sizes have been combined with the monument itself, which looks out from the Place des Alpes over the lake.

The equestrian figure itself is a good one, and the horse is one of the small class of motionless animals which, when properly handled, are more satisfactory than even the successful ones which indicate locomotive effort of more or less pronounced character. Where the horse is quiescent, the rider, in whose honor the monument is created, obtains more consideration from the observer. In this case, however, the altitude at which the horse and man are set give them about as much value as an ordinary weathercock.

In the cases of the tombs of the Scaligers and of the Duke of Brunswick the equestrian figure crowns the composition, while the tomb proper is sheltered beneath the canopy. In two other cases, the Otho I at Magdeberg and the Francis I at Prague, use is made of the canopy to shelter the equestrian portions of the monument.

While searching for connecting links between the sculpture of the later Roman Empire and the early part of the mediæval period it at first seemed likely that the only existing statue that could be credited to the Dark Ages was that of Otho I at Magdeberg, which has sometimes been ascribed to the tenth century, and, in such case, would possibly have been erected during Otho's life or shortly after his death. The evidence of historic facts and the internal evidence afforded by

the statue itself, however, refute this theory, though they do not deprive it of the honor of being one of the oldest portrait statues on horseback of the mediæval period. When the monument was repaired in 1858 by a Herr Holbein it was found not to be a monolithic statue, as had been supposed, but one built up out of seventeen pieces of sandstone held together by iron dowels, and an analysis of the stone showed it to be of the same composition as that with which the thirteenth-century portions of the cathedral were built; this, taken in connection with the evidence afforded by the style and workmanship of the group, makes it probable that the statue was cut at that time, and probably by some of the sculptors who were employed on the cathedral. The fact that the entire town was twice destroyed by fire, once in 1180 and again in 1207, while the monument bears no signs of injury, is testimony, also, against a very early date, though, as the monument was restored in 1540 and in 1651, as well as in 1858, there is no reason why the wounds of both fire and time should not have been healed over and over again. Although of stone, the statue is gilded, and when at its latest restoration the gilding was renewed traces were discovered of an earlier red coating, which was supposed to be merely a coat applied to prepare the stone surface for gilding. But the fact that Otho the Great, as did Charlemagne and Louis XII, took a leading part in the actual administration of justice, connects him intimately with the history of

Charles, Duke of Brunswick, Geneva, Switzerland. M. Cain, Sculptor. From the *Algemeine Zeitung*.

the derivation of German law, and in the early legal annals he is spoken of as "*rufus*," and sometimes as "*sanguinis*," so that it is not at all improbable that the red coating was not a preparation for a coat of gilding, but was at one time the final color of the statue — at a later day it is known to have been painted white, to ape marble. This association of the statue with the law of the realm has other support in that the monument is supposed to stand on the spot where in Otho's time stood "the scaffold under the lime-tree on the market-place" — the tree of blood where sentence of death was carried out. It is thought, too, that the large cloak worn by the emperor was intended to typify his judicial attributes.

The amiable family affection or, more likely, the less amiable pride of race that led the Duke of Brunswick to surround his monument with statues of "our father and grandfather, of glorious memory" was also exhibited in the case of the monument of Otho I where the shaft that supports the canopy and its enclosed equestrian statue is reinforced by pedestrian statues of the Emperor's more or less illustrious ancestors — some quite as savage and uncivilized as illustrious.

A variant upon the same theme was effected at Prague where, in 1850, on the Franzensquai, was erected a monument to Francis I, where the encompassing auxiliary statues were made to represent not the worthy forebears of the Emperor but the sixteen districts of Bohemia, while the Virtues with which Can Signorio inconsequently surrounded his own sarcophagus and which are recalled by the two female figures that lead the horse of Otho, are in the case of the Bohemian monument replaced by allegorical figures which represent the hackneyed typical groups of the present more material day. A sermon could be based on the substitution of the groups that now everywhere symbolize Art, Commerce, Industry and Science for the figures that in a less sophisticated age stood in similar positions for the cardinal virtues. It was only a fashion, to be sure, and probably often hypocritically followed, but it really seems as if artists must have been able to produce nobler work when they were habitually trying to typify some ennobling Christian virtue, as Justice, or some merely savage one as Courage, than when they are trying to glorify Trade — with its suggestions of greasiness and evil smells.

The monument, seventy-seven feet high, Gothic in style and suggesting in general the Eleanor's crosses, was designed by Kramer, and the statues were the work of Joseph Max, father of the well-known painter of to-day, Gabriel Max.

CAN GRANDE. — Can Francesco della Scala, called the Great, was the most illustrious of his family. He was appointed captain of the league made by Verona, Mantua, Brescia, and other towns against the Marquis of Este, Lord of Ferrara, whom he defeated and obliged to withdraw to Ferrara. He subsequently became the head of the Ghibelline party in Lombardy. In 1329, he took Treviso, but was a few days after seized with a violent fever, which carried him off at the age of 39. He was a liberal patron of literature and the arts, and his court was attended by poets, painters and sculptors. Dante and Boccaccio have both written of him.

DUKE OF BRUNSWICK. — Charles, eldest son of Duke William Frederick, was born in 1801. He was educated in England with his brother William, but displayed such frivolity of character, that his guardian, the Prince Regent, delayed putting the government of Brunswick into his hands until more than a year after he had attained his majority. In 1830, his subjects, weary of his extravagances, rose against him; he fled, and in the following year was deposed by the German Diet. During the remainder of his life he resided chiefly at Paris and Geneva, immersed in pleasure, and on his death (in 1873) bequeathed his immense property to the latter city.

AUGUSTE NICOLAS CAIN. — Born at Paris in 1822. He was a pupil of Rude and Gumery. He is in the very first rank of sculptors of animals, and has produced a great number of works, gaining several medals at the *Salon*. The Luxembourg contains his "Vulture on the head of a Sphinx"; and in the Tuileries garden may be seen his fine groups of "A Lion killing a Crocodile," and "A Lion bringing a dead Peacock to its Cubs." Two of his most important works are "A Rhinoceros attacked by Tigers," and "A Lioness and her Cubs with a dead Bear."

CHARLES FRANÇOIS MARIE IDRAC. — Born at Paris in 1827. A pupil of Rude. Medals in 1864 and 1868. Among his works are "Le Chasseur," a statue executed for the "Cour du Manège" of the Louvre; statues of St. Albert, St. Paul and St. Peter; a number of decorative sculptures and many busts.

ALEXANDRE SCHOENEWERK. — Born at Paris, 1820. Pupil of David d'Angers, Jollivet and Triqueti. His principal works were "The Young Tarentine"; "Rape of Dejanira"; "Lalla" (in the Grand Opera); "St. Thomas Aquinas" (for the façade of the Sorbonne); "Hesitation"; and "Mme. Dompierre." His statues entitled "Young Girl at the Fountain" and "In the Morning" are in the Luxembourg. Schoenewerk died in 1885.

JEAN FRANEL. — A Genevese architect died in 1886. Besides the Duke of Brunswick Monument he was the architect of the University in the same city.

AIME MILLET. — Born at Paris about 1826. Pupil of David d'Angers and Viollet-le-Duc. He made his début as a painter at the *Salon* of 1849 and continued to exhibit pictures until 1853. It is as a sculptor, however, that his chief fame has been gained. His notable works include "Ariadne" and "Cassandra placing herself under the protection of Pallas," both at the Luxembourg; "Vercingetorix," erected at Alise-Sainte-Reine; the tomb of Murger; "Apollo and the Muses of Poetry and Dancing," on the Grand Opera; a statue of Chateaubriand, erected at St. Malo; one of Denis Papin, at Blois; the tomb of the Princess Christine de Montpensier, at Seville; three colossal figures of Prudence, Commerce and Finance for the façade of the Comptoir d'Escompte de Paris; a statue of "Physics" for the Nice Observatory; the tomb of a Prince of Saxe-Coburg Gotha; a statue of George Sand for La Châtre; one of Edgar Quinet, at Bourg; one of Phidias for the Luxembourg garden; and "Civil Justice," made for the Mairie of the First Arrondissement of Paris.

FRANCIS I, Emperor of Austria. — Born in 1768; was the eldest son of Leopold II, then Grand Duke of Tuscany, who became Emperor of Germany in 1790. Leopold dying in 1792, Francis was elected Emperor of Germany under the title of Francis II. He joined Frederick William II of Prussia in the war against France, but was compelled to conclude the peace of Campo Formio, in 1797. He renewed the war, in alliance with England and Russia, in 1799, but was again obliged, by the defeats at Marengo and Hohenlinden, to agree to the treaty of Lunéville (1801). In 1804, he proclaimed himself Emperor of Austria (Francis I), and, after the disastrous campaign of 1805, and the establishment, under Napoleon's protection, of the Confederation of the Rhine, he issued a manifesto, declaring that he abandoned the title of German Emperor, and the dignity and position of head of the Holy Roman Empire (1806). In 1809 a fresh outbreak of hostilities with France was followed by the humiliating peace of Schönbrunn. Francis reluctantly granted Napoleon's request for the hand of his daughter, Maria Louisa. In the German "War of Liberation" (1813-14), Francis, with Frederick William of Prussia, was at the head of the movement, and was present in person till the end of the campaign. In 1814, he returned to Vienna, amid the rejoicings of his subjects, and after the conclusion of the peace of Paris, found all his losses made good to him. The remaining years of his reign were prosperous. He died in 1835, endeared to his subjects and the idol of the Viennese.

[To be continued.]

BUILDING LAW.

TERRE HAUTE, IND., May 29, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A builds a block of tenement-houses, and employs B, an architect, to prepare plans, let and superintend the works, C is contractor and D a sub-contractor. The specification has this clause in it: "The contractor or his sub-contractors, and his and their workmen must agree (and this writing is the agreement) that they shall remove from the building any work or material not in accordance with the plans, details, elevations, all drawings and specifications. And they must agree, that the opinion and decision of the architect is binding to them, as well as it is to the proprietor." The sub-contractor D signs a contract with the main contractor C, to the same effect; that is, that the opinion and decision of the architect is binding to all, etc.

The specification further reads, that it must not be understood that the sub-contractors will receive certificates direct from the superintendent. The main or principal contractor, only, will receive these, assigned for the special benefit of the sub-contractor.

Now D, the sub-contractor, quarrels with C, the main contractor, as to certain works to be done and which he (D) tries to avoid: finally he is compelled to do them, and gives final receipt for all his work, including all disputed matters. A day after, D, the sub-contractor, calls on the architect with a bill of extras, one-fourth of which the architect acknowledges as correct, and three-fourths as incorrect, and then because the architect refuses to agree on the whole, D sues the principal, A, for a number of items and damages in which all the disputed matters settled with the main contractor C, figure again.

The question before the architect B, is this:

Question. — 1. *Shall the specifications and contract, stand good before the law, where it says that the main contractor shall only get certificates to be assigned to the sub-contractor?*

2. *Shall the agreement of A with the main contractor and his sub-contractor, "that the opinion and decision of the architect is binding to them, as well as to the proprietor," remain valid in law?*

As you have a legal gentleman attached to your editorial staff, we will be pleased to see the *American Architect's* answer to these questions as it is a matter in which every citizen making a contract for a building, is interested. Respectfully, V. & S.

Answer. — We do not find anything in the contracts and other facts referred to in the above communication to prevent D, the sub-contractor, from collecting his claim from A, the owner, providing he can satisfy a jury that the work which he claims as an extra was ordered by the owner or by the architect, and in the latter case that the architect had authority to give the order. The terms of the contract and the fact that there was any contract at all between the plaintiff in the action and the principal contractor, would have nothing to do with the case except as evidence tending to rebut the plaintiff's claim that the work in question was done under contract between him and the owner. The decision, however, in such cases is always with the jury; a written contract between the plaintiff and some third party is evidence merely and not conclusive; and if the jury believes that the owner and plaintiff entered into a separate and distinct arrangement for the work in question they will find for the plaintiff.

The clause in the sub-contract subjecting all matters of dispute to the decision of the architect would have no binding force in any action between one of the parties to this contract and a third party. The owner not being a party to the contract could take no advantage of the clause.

Whether the receipt given by the sub-contractor to the main contractor covered the work in question would also be a question for the jury; if the work was outside the sub-contract and undertaken under a direct arrangement with the owner, of course a receipt given to the main contractor would not bar the sub-contractor from recovering the price agreed upon with the owner.

We are therefore compelled to answer both of the questions which our correspondent puts at the end of his communication in the negative: that is to say, the specifications and contract would not "stand good before the law," nor would the decision of the architect be binding, at least in the sense which our correspondent means. This whole question like most of the disputes that are continually arising in the building trade, is one of fact simply; and the best way to avoid them is for the architect not to get a general authority from the owner to order extras, but whenever anything is needed that is not in the contract, to make a new formal contract in writing either with the main contractor or some other person.

SOCIETIES

THE SYRACUSE SKETCH-CLUB.

AT Syracuse a sketching-club has just been formed, to be known as "The Syracuse Sketch-Club," and to be composed of the draughtsmen (both architectural and mechanical) and a few others interested in art matters of our city. This is a subject that has been long thought of and talked about, and now that we have made a start it is our purpose to make a success of it. These gentlemen were chosen as officers for the first year: James A. Randall, President; James A. Johnson, Vice-President; William H. Lord, Secretary and Treasurer. You will confer a favor on the draughtsmen by noticing this. Yours truly,

WILLIAM H. LORD, *Secretary and Treasurer.*

BOSTON ARCHITECTURAL CLUB.

THE Boston Architectural Club held its fortnightly conversazione Thursday evening, June 18.

Mr. C. Howard Walker gave an informal talk on Italy, illustrating his remarks with stereopticon views. Speaking at first of the impressions one gains from modern Italy, he passed at once to Rome. Dividing the architecture into three periods: Classic, Gothic and Renaissance, he dwelt at length on each. He showed views of the Roman Forum, explaining the modern excavations and discoveries; then taking each of the principal buildings and triumphal arches, related their history and explained their architectural characteristics. Passing to Pompeii, and showing the principal buildings of that city, he took up the Gothic period and illustrated by views of the principal cities where this period reached its highest development.

The principal works of the architects of the Renaissance were then discussed, and the different phases it took in Rome, Florence, Venice and Sienna. The views were well arranged and admirably selected.

An exhibition is being held at the club-rooms of a number of water-colors made by Mr. Dwight Blaney, while on a recent trip to the Bermudas.

TRADE SURVEYS.

THE tenor of commercial, financial and railroad returns for the past six days puts a decidedly better coloring upon general trade and manufacturing conditions of the country. Quite a number of statistical returns have been published, a study of which indicates the general drift of trade which has heretofore been observed. The conclusion drawn from the bulk of this information is that, first, the volume of traffic has begun to increase, that margins in several lines of trade are a little more satisfactory, that the crop reports are more promising, that the distribution of merchandise throughout the interior of the country has improved, that money is easier both in financial centres East and in distributing centres West, as railroad-builders are regaining confidence for the operations of the coming six months; that failures, considering the amount of business transacted, are declining, and that the condition of the wage-workers throughout the country is better than thirty days ago. There are a number of other points that might be mentioned as showing the growing strength in the general business situation, but the above are sufficient at present. The gross earnings on 130 railroads show an increase of nearly one-and-a-quarter million dollars. The actual earnings in May for these roads footed up $31,483,240. The mileage is 77,405 miles, or nearly 3,000 more than last year. The earnings increased 5.51 per cent; the mileage, 3.70 per cent. Nine Northwestern roads earned more this year than last, which is saying a good deal considering all the unfavorable reports that have been received. The Southern railroads do not show such favorable earnings. For five months 120 roads earned $9,788,197 more than last year. A great deal might be added concerning the earnings of individual roads, but reports are more instructive. In a general way the railroad situation throughout the country is improving. There is no doubt now entertained on Wall Street that the traffic for the coming six months will exceed the traffic of the same six months last year. Strange to say, this confidence is not influencing stock speculations. Good stocks are not to be had, and poor stocks are not wanted. The outside public are still refusing to speculate. English capital is seeking other than railroad-building channels. Railroad-building for the next six months is very uncertain. Last week, contracts for 20,000 tons of steel-rails were placed in Eastern mills. This week, from present indications, about 40,000 tons will be placed, three quarters of which will be for Western and Southern roads. The trunk-lines, between New York and Chicago, will buy very soon from 10,000 to 15,000 tons of rails to repair with. Rails are hardening in price. Small lots are selling now at $28, as against $27 a month ago. The additional allotment recently granted will allow urgent buyers to obtain what they need for midsummer work. The coal situation is not satisfactory. The consumption as compared to last year is somewhat less, being due to the diminished output of iron and steel. The small shop, railroad and general manufacturing requirements are fully up to last year. The anthracite regions have been put in better producing shape, but the cost of production has not been decreased. In fact, it has gradually increased owing to the great depth at which coal is to be sought. There is a great stir among the miners of bituminous coal, and within the last thirty days four or five companies have been organized to develop new territory, most of it in Virginia and Kentucky. Small companies are organizing in the far West, and the disposition to develop mining territory heretofore referred to is growing.

In the lumber trade the demand has not improved as much as timber speculators anticipated. Building operations are absorbing all that was expected, but the wholesalers and retailers are catering to this trade, instead of buying large quantities are buying only such lumber as their customers will want. For this reason stocks in large cities are declining. The wholesalers have discovered that when they buy heavily they will crowd prices up on themselves. In order to protect themselves they are buying only for requirements. The attempt in Georgia to combine on yellow pine has been practically a failure. Outsiders came in and offered lots to-day at last year's prices. They are still doing this and no doubt will continue this policy till the close of the season. The strong companies there have the alternative of either dropping prices or finding sales accumulating on their hands. Besides this, great developments are being made in Mississippi, Arkansas and to some extent in Texas, and the supply of cypress, yellow pine and other woods in Western markets is crowding out white pine and influencing white pine quotations. During the past two weeks reports have been received from a number of leading architects in Chicago, St. Louis, and from architects in the far northwest territory. They report a very active distribution of iron and steel, merchant steel, sheet-iron, barbed-wire, and farm and building equipments as well as builders' hardware. The small machine-shops between Pennsylvania and the Mississippi river are crowded with work. The ship-work now in the lake ship-yards is as good as it could be. The leading iron-works making structural shapes are also as crowded with work as they have been at any time for years. In Pennsylvania some 20,000 or 30,000 tons of material will be placed under contract before the first of September. Builders are crowded with work as fast as possible. No strikes have occurred, and it is now an assured fact that so far as the building trades are concerned there will be no trouble up to the close of the season. Information from labor sources seems to point to a determination upon the part of labor organizations next year to precipitate an eight-hour legislation. A reactionary tendency is at work among certain labor organizations, but at this writing it is not possible to say whether the conservative or radical elements will win. The radical element is made up largely of foreign workmen who believe that the present opportunity is the most opportune for the establishment of an eight hour working-day. The American element are not contributing as largely in such a revolution but are willing of course to profit by it and probably will bring up the rear should a general strike be resolved upon. The brick-makers throughout the country are hurrying forward work on spring contracts and thus far have been able to meet all requirements. The demand for cements, lime, lath and shingles has been extraordinary and notwithstanding the heavy distribution of such stocks supplies are now as full as they have been at any time this year. Within the past thirty days heavy shipments of mining machinery have gone into the far West to new companies which are now negotiating for large quantities of new machinery in a very expeditious and economic manner.

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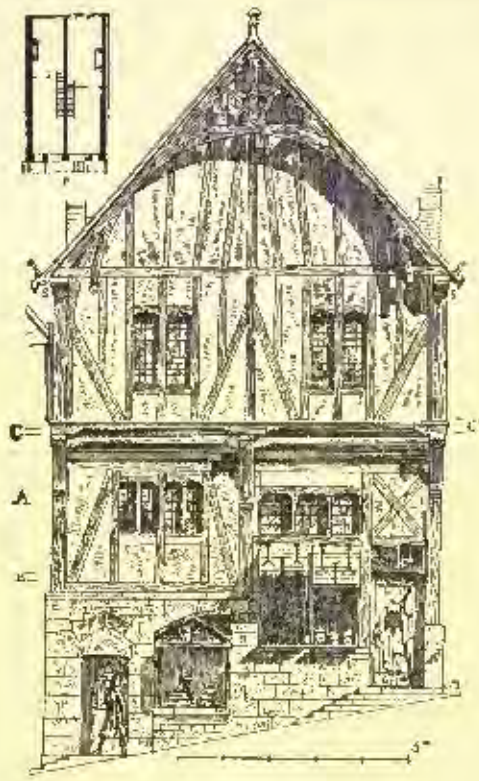

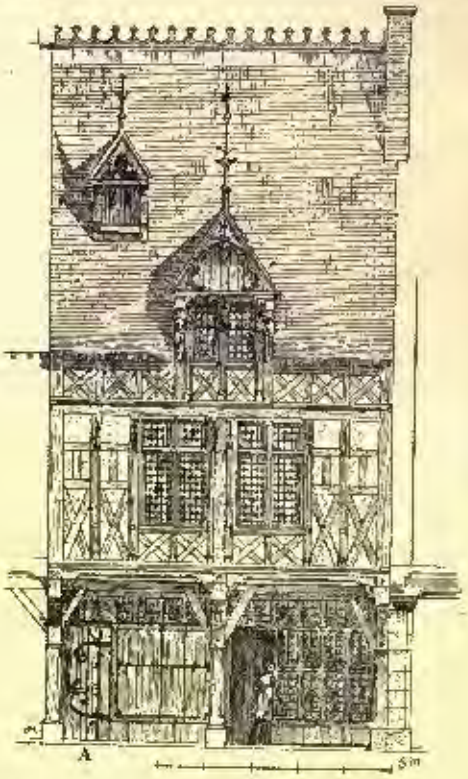

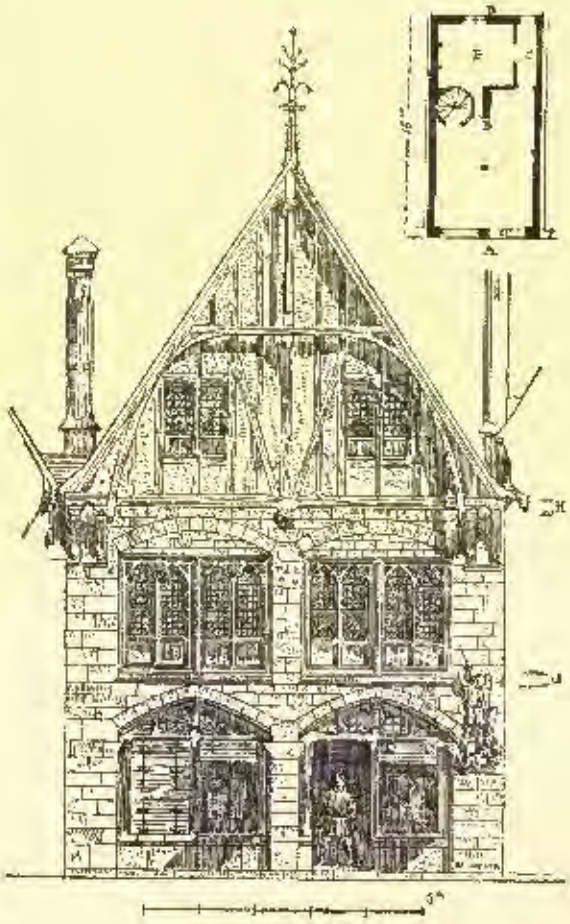

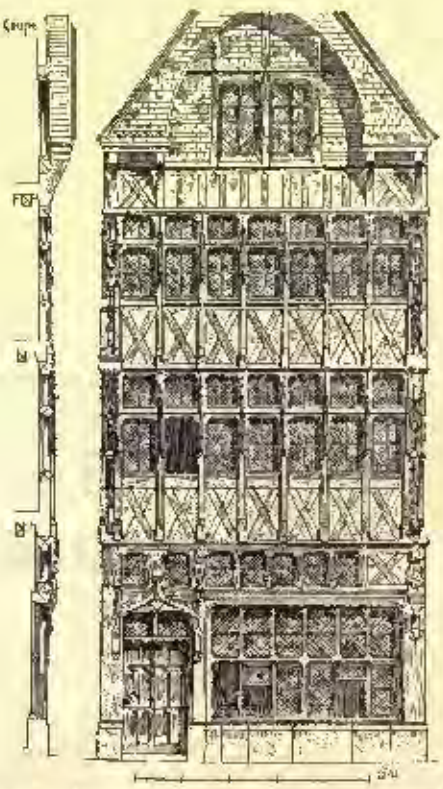

HALF-TIMBER HOUSES.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 29, 1889.

Entered at the Post-Office at Boston as second-class matter.

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A SCHEME which has long been discussed in New York has finally taken definite shape, in the incorporation of the American Fine Arts Society, which includes representatives of the present Society of American Artists, the Architectural League, the Art Students' League, the Society of Painters in Pastel, and the New York Art Guild, and is to be maintained under the joint patronage and control of these societies, and of such others as may join the movement hereafter. The object of forming the new corporation is to give the societies interested a better opportunity than they have yet had for combining their efforts and influence for the purpose of promoting the good of the fine arts, in whatever way may seem advisable, and the first step toward that end which has occurred to the managers of the new society is to consist in the erection of a building, which is to contain rooms where works of art may be exhibited, as well as permanent accommodations for the various societies represented in the new federation. The rents have been fixed at the moderate rate of fifty cents per annum per square foot of floor-space occupied, for the portion permanently taken up by the societies, and twenty-five dollars a day for the use of the galleries. The New York daily papers say that this small sum pays for the use of all the galleries together, and that they are to be arranged to be used for concerts and other entertainments, as well as for exhibitions, so that we imagine that there must have been some slip in the original report, which we leave our readers to correct according to their own judgment. The capital to be used for carrying out this modest plan is fixed at fifty thousand dollars, and is to be raised by subscriptions of one hundred dollars each. Besides the stock, coupon bonds are to be issued, the interest on which is to be paid, if earned from rents, but if the rents should not be sufficient to pay the interest, the holders of the bonds, by surrendering their coupons, may obtain free tickets to the various exhibitions to be held in the building during the year. Beside the stock-holders and the bond-holders, there is to be a class of Fellows, who, by the contribution of one hundred dollars, are to be entitled through life to five season tickets to all the exhibitions given by the Architectural League, the Society of American Artists, and the Society of Painters in Pastel. The proceeds from the sale of such fellowships is to be devoted partly to extinguishing the bonded debt of the corporation, while the rest is to be distributed among the constituent societies in equitable proportion.

ANOTHER artistic association, with, however, a special purpose, which has just been formed in New York, is the National Free Art League, an organization of artists and other persons interested in art, intended to promote, by the number and character of its members, and the influence they may exert, the repeal of the unjust, ridiculous and injurious laws in regard to the importation of foreign pictures and statues which have so long annoyed our artists. The names of the officers of the League are in themselves sufficient to show the seriousness of the movement, and the energy with which it is likely to be carried on. The President is Mr. J. Carroll Beckwith, the Vice-President is Mr. William M. Chase, the Treasurer is Mr. Henry Marquand, and the Secretary is Mr. Kenyon Cox. Besides the officers, more than five hundred artists and lovers of art are enrolled as members, and many applications for membership are daily received. There are no membership dues, and persons interested in the purposes of the League are invited to send their names to the Secretary, Mr. Kenyon Cox, 145 West Fifty-fifth Street, New York, upon which they will be enrolled, upon signing the Articles of Association, and will be kept informed, from time to time, of the progress of the movement, and the success of the work undertaken by the League.

THE Brockton *Enterprise* makes some suggestions in regard to obtaining designs for a new city-hall for that town, which are open to criticism, in the interest of the citizens. It remarks that a competition among architects has been proposed, but says that the fear has been expressed that "an open race of the kind would only be entered by second-class architects, and that the big firms would not submit any plans." As the people of an ambitious and prosperous town like Brockton naturally want something better than second-class professional service, the *Enterprise* proposes to meet the difficulty by having the City-hall Committee do "as a similar committee has done in Haverhill," that is, "to advertise in the Boston papers that at a certain hour of a certain day they will be in session at the present City-hall to consult with architects who will submit plans for the proposed building." We should say that it would be well for the people interested, before following this advice, to find out what result such a course has had in Haverhill. Among respectable architects the idea of dancing attendance on "a certain day" upon a committee that does not know what it wants, and has taken no pains to find out, and can think of no better way of enlightening itself than to let a lot of builders' clerks and draughtsmen talk to it for an hour, all at the same time, would be about as uninviting as anything that could be proposed, unless, perhaps, it should be surpassed by the next piece of counsel offered by the *Enterprise*, which is that "the right to reject any or all, and not to pay for any not accepted, could be reserved," and it adds, as if it could think of nothing more enchanting to the professional mind than this prospect, that, "The more architects that compete, the better for Brockton."

WE had supposed that this way of thinking and talking about architects and competitions was obsolete in any civilized community. To show how absurd and ridiculous it seems to any one who knows anything about plans and buildings, we will suppose that, instead of a city-hall, the people of Brockton want a map of the town. They appoint a committee, which sets an hour on which all its members will be at leisure from their respective avocations, and invites engineers and surveyors to meet it. The first surveyor asks whether the town requires a topographical survey, or one showing merely boundaries. The committee reflects. None of its members have ever heard of a topographical survey, and have not the least idea what it may be, but they do not like to say so, and the name sounds well, so they answer that that is what they want. The next visitor is a scientific person, who thinks that the survey ought to be geological, and is made happy by being told that it will be an excellent thing to have it geological as well as topographical. Each of the other inquirers has a different idea, and all the ideas seem to the committee, which comprehends few of them, to be excellent. The intending competitors go back to their offices, each with a different notion of what is required, and set at work. At a given time a mass of plans, of the most diverse description, and involving immense labor, is presented to the bewildered committee. Even then, the idea of asking for advice from some

one who understands the subject does not occur to them, and after looking at the drawings, with a feeble pretence of understanding them, for a few hours, they adjourn. On reassembling, they find that a member has brought a friend along with him, a person of local reputation and influence, whom, after much persuasion, he had induced to "take part in the competition," and who has "brought in his plan." The "plan" is simply a collection of old plots, gathered partly from imagination, and partly from the Registry of Deeds, harmonized and "doctored" as the case may require, and with the streets dashed in with a bold hand. The author of this "design," which represents about half-a-day's work, explains that he is "no hand at making pretty pictures," but "looks to the common-sense of the thing," and stands, wreathed in smiles, while the delighted committee examines his production. As one after another discovers his grandmother's wood-lot on the plan, the satisfaction of the members increases, and without more ado, the chairman puts the vote, all the other plans are rejected, and the new comer is unanimously selected to prepare a map, which is only found to be incorrect and valueless after he has got his pay.

Of course, American committees will resent the idea that they are not perfectly capable of giving any instructions as to the preparation of designs for a city-hall, and of judging the designs after they are submitted, but the fact is that they are not capable of doing so, and architects know that they are not, and nearly all the most reliable architects in Massachusetts have agreed to have nothing to do with public competitions where their work is not to be judged by experts, and where the designs submitted are not to be made in accordance with a programme drawn up by competent hands, and issued to all alike, in which proper compensation is promised without reserve to the author of the best plan. Nothing else, as they know, offers any chance of satisfaction either to architects or to the people for whom they build. It ought not to be necessary to say that the essential part of a public building is the plan. With a good plan, a good building can be made with cheap materials; without a good plan, no expenditure of money can make a good building. On the plan of such a building depends not only whether large sums of money shall be buried forever in tortuous corridors, dark courts, useless space where it is not needed, and rooms too small for use, but whether an additional outlay shall be required every year for burning gas in places which "turned out" not to have daylight, and for extra service for overcoming inconveniences of arrangement; and no lay committee-man can judge for such details. Every architect has seen plans which pass muster with lay committees, in which important rooms are supposed to be illuminated by areas marked "Light and Air," in which there would be no more light or air than at the bottom of a well, while partitions stand over nothing, towers appear unexpectedly, supported on the roof, and the stairs in one story prove to be entirely independent of the story above or below. The only remedy for these inadvertences, after the building is executed, is a very costly process of remodelling. The best means of prevention, which is in this case a hundred times cheaper than cure, is the employment of a first-rate architect. From quacks in medicine a sick man may, with the help of his imagination, and, perhaps, a lucky chance, get relief from his pains, but the architectural quack cannot administer doses of brick and mortar at random with good effect, and he who would have his brick and mortar distributed judiciously, economically and beautifully must apply to persons capable of doing so, and must offer them what they consider fair treatment to obtain their services.

LA SEMAINE DES CONSTRUCTEURS publishes an account of a long-forgotten competition, which took place in Russia in the year 1764, when, we must remember, Russia was little better than an empire of Cossacks and Tartars. The city of St. Petersburg was at that time rapidly developing from a cluster of huts into the capital of a powerful government, and it was decided to try to improve it after some definite and well-considered plan. With this view, the Empress Catherine appointed a commission, which announced a competition on a model which might have been familiar then, but has, unfortunately, since gone out of use. All architects and amateurs in Russia were invited to furnish suggestions for a plan for laying out the city, a map of which was supplied them on application. Three months was allowed for the preparation of the sketches, which were to be handed in under cipher. The judgment which followed was the most curious part of the affair, for the jury consisted of all the people in Russia most skilled in the subject; namely, the competitors themselves. Immediately on the delivery of the sketches, they were to be exhibited for fifteen days in a place where all the competitors could have free access to them, and there each competitor was requested to examine them, and write a careful criticism of all the plans except his own, designating particularly the portions of each plan which appeared to him most successful and best adapted for carrying out. At the end of the appointed period the commissioners were to consider the designs and the criticisms, and decide for themselves what plans, or portions of plans, should be carried into execution, and it was promised that the authors of schemes, or parts of schemes, selected for execution should be employed, by preference, in carrying them out; while even those whose projects were not approved were to receive a compensation "in proportion to their labor." Whether this curious competition was ever carried so far as to the actual selection of a plan in the way promised we do not know, but some student of Russian history can, perhaps, inform us.

SOME unfortunate official in England recently took it into his head to improve Westminster Hall, which has long been a sort of neglected corner among the Government buildings, by putting a staircase in it, and, as he might have expected, has brought a storm of criticism and ridicule about his ears by doing so. It is very likely that nobody wanted the staircase for use, but that probably would have made no difference in the criticisms, which appear to be directed at everything, whether of any importance or not, which has any connection with the structure. As it happens, the unfortunate official in question, thinking to make the building under his charge more interesting, had some heraldic animals carved on the top of the newel-posts. He could hardly have put anything more innocent there, but no sooner had they appeared than a member rose in the House of Commons, to inquire "why those stone carvings of birds and beasts" had been put on the pedestals flanking the Westminster Hall stairs. The supervising official explained that the "birds and beasts" were simply heraldic objects, which were taken from the coats-of-arms of various Kings and Queens of England, and served to designate, in an indirect way, the sovereigns who had done most, since the time of William Rufus, for the improvement and decoration of the Hall. One would think that this answer would be enough for a sensible man, but it was not enough, it appears, for a member of the House of Commons, and a second question was propounded, inquiring whether "the Right Honorable gentleman was himself responsible for many of the fearful creatures in Westminster Hall." This sort of interpellation seems to have been too much for the temper of the "Right Honorable gentleman," who replied that "he was not responsible for the fearful creatures, either in Westminster Hall or in this House." "Much laughter" followed these elegant dialectics, and the original questioner, who appears to have felt that he had got the worst of the discussion, avenged himself by threatening to move for a reduction of his opponent's salary. Why the official did not retort by demanding an investigation into the state of his questioner's account with the washerwoman, we cannot see, but it is possible that a sense of decency may have come, somewhat late, to his aid. In fact, the circumstance that he had consented to putting anything so harmless as heraldic leopards on the newel-posts indicates that this may have been the case, while the well-regulated mind must shudder at the thought of the decorations that would have been suited to his opponent's taste, if their official positions had been reversed.

MR. A. W. BLOMFIELD, a well-known English architect, has just received the honor of knighthood, to the great satisfaction of the editor of the *Builder*, who thinks that architects in England have of late been altogether too much overlooked in the distribution of honors of the kind. It does not appear that any particular work of Mr. Blomfield's has earned for him this recognition, but, like most things of the kind in England, it seems to have been the long-delayed reward of many years of skilful and honorable practice. Americans know very little of the effect upon a man's happiness of the addition of a title to his name, but very many American architects, to whom his name and reputation are familiar, will be glad to join with the English friends of Sir Arthur Blomfield in congratulations suitable to the occasion.

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND.[1]—II.

THE WYTHE HOUSE.

JUST north of the church-yard, and fronting upon a grassy open known as "Palace Green," on the upper side of which stood Lord Dunmore's house, or "the Governor's Palace," as it was called among the patriots of '75, stands a fine, old, square brick house which, the inquiring stranger will be informed, "was once General Washington's headquarters." Historical accuracy, however, resolves this tradition into the lesser fact that Washington spent the night at this house, the house of his friend George Wythe, on his way to join Lafayette at Yorktown in the latter part of September, 1781.

The old house is, however, quite interesting on its own account, and on going up to have a look at it, I was very courteously admitted, and had the pleasure of walking about the broad hall and large square rooms, and the further good fortune of hearing a sketch of the history and a legend or two about the old house, which, I think I cannot do better than transcribe here, as literally as may be.

The Wythe House, as this old homestead is called, was built by Colonel Louis Taliaferro and given as a marriage portion to his daughter, the wife of George Wythe, who, to quote one of his biographers, was "the pure and virtuous Chancellor, a member of the House of Burgesses, a signer of the Declaration of Independence, a Member of Congress, Speaker of the House of Delegates, Judge of the Court of Appeals, a member of the Conventions on the Constitution of the United States, and Professor of Law at William and Mary College. To him was reserved the honor of devising the emblems and motto of the shield of Virginia." Wythe enjoyed the intimacy of Jefferson, Mason, Washington, and, in short, of the brightest minds of his day in Virginia.

The Chancellor's end was a tragic one, for he was poisoned by a nephew to whom he had bequeathed a large portion of his property. Though he died in Richmond, Williamsburg claims his ghost, and it is said that on the anniversary of his death, the 8th of June, a shadowy form in antique garb glides from out the closet of his chamber in the old house, and a cold hand is gently laid upon the face of the sleepers in the room.

After the Chancellor's death the property passed into the hands of Mr. Henry Skipwith, the third husband of the beautiful Elizabeth Byrd, of Westover on the James.

The wraith of the fair Elizabeth, also, occasionally honors Wythe House with a manifestation, appearing in full ball dress, with sweeping train of rich brocade and high-heeled scarlet slippers with diamond buckles.

Yet another spectral tenant was known in the flesh as the consort of Governor John Page, who purchased Wythe House upon the death of Colonel Skipwith, and it is whispered that even the stately form of the Father of his Country himself, who was always a great friend of Wythe's, has been seen in the halls and on the broad stairway.

Time would fail me to tell of the wierd sounds that are heard, the doors that open without the touch of mortal hands, the phantom shapes which have been seen gliding through the halls and corridors. But, one and all, these ghosts are ghosts of high degree and of unexceptionable deportment, and never in the least have they encroached upon the peace and comfort of the residents of Wythe House.

There is nothing especially noteworthy in the architecture of this old mansion unless it is the air of solid and substantial comfort which it wears. The plan is a very simple one—a wide central hall through the middle of the house, and two rooms on either side of this, each having four windows and a great fireplace. I did not examine the arrangement of the second story. The kitchens and offices are in a rear building.

WILLIAM AND MARY.

The college buildings stand marshalled on three sides of the old campus at the western end of Duke of Gloucester Street, the main house facing toward the street while the President's house and Brafferton stare at one another across the campus. The two latter are plain square buildings of considerable age. The schools have been three times destroyed by fire. The original buildings were "the composition of Sir Christopher Wren," and presumably very fine. They were burned in 1705, "the Governor and all the gentlemen that were in town coming in the lamentable spectacle, many of them getting out of their beds." Of the second structure we only know that Mr. Jefferson, who, by the way, was a tremendous critic in architectural matters, though perhaps not always successful in the application of his theories to practice, thought it looked very like a brick-kiln. There is now very little of interest about the place from an architectural point-of-view, or to one in search of the picturesque.

The statue in white marble of Norborne Berkeley, Baron of Botetourt, which stands in the centre of the campus, was erected by the Assembly shortly after the death of Lord Botetourt in 1770, in grateful memory of a governor who was everywhere esteemed throughout the colony. He was a liberal patron of the college to which he gave many prizes, and at the time of his death he was earnestly striving to win from the home government repeal of the acts which had given such offense to the colonists. The ravages of time or fortunes of war have despoiled the marble baron of his aristocratic nose, and some night-prowling and irreverent undergraduate has recently affixed a gory streak of red sealing-wax across the august countenance, lending an ensanguined and hostile look to the benign features.

Old William and Mary enjoys the distinction of being, after Harvard, the oldest college in America, and she has counted among her sons very many of the great ones of our land, having "sent out for their work in the world twenty-seven soldiers of the Revolution, two attorney-generals, nearly twenty members of Congress, fifteen senators, seventeen governors, thirty-seven judges, a lieutenant-general and other officers, two commodores, twelve professors, four signers of the Declaration, seven cabinet officers, a chief justice, and three presidents of the republic."

In colonial times it was the only educational establishment of the rank of a college in all Virginia, and directed the intellectual training of a majority of the best men in the colony, although a very aristocratic few of the sons of the wealthier families were sent over to Eton and Oxford.

The history of the college is closely interwoven with that of James Blair, Commissary to the Bishop of London and Rector of Bruton Parish, who was its founder, first president and lifelong defender. The colony sent him to England on a mission to King William in behalf of the projected institution, and he returned in 1693 with the charter of the college signed by their august majesties, William and Mary. It was liberally endowed with rich lands, a sum of £2,000 arrears of quit-rents, one penny per pound on exports of tobacco, the office-fees and emoluments of Surveyor-General and a seat in the Assembly, and was founded as "a seminary of ministers of the Gospel where youths may be piously educated in good letters and manners; a certain place of universal study, or perpetual college of divinity, philosophy, languages, and other good arts and sciences."

The English Attorney-General Seymour, when ordered to draw up the charter, objected to the expenditure of public funds for making divinity-students while England was at war and wanted soldiers, and to the redoubtable Blair, who urged that Virginians had souls to save as well as the English, he thundered out, "Souls! Damn your souls! Make tobacco!"

In the library, among many costly treasures in rare old volumes and prints, are two portraits of Parson Blair done at different periods in the stormy and eventful life of that fiery old polemic.

THE POWDER-HOUSE.

There are to be seen at the post-office, in Williamsburg, some very interesting old files of the *Virginia Gazette*, a journal which was started at Williamsburg in 1736, and was the first and, for many years, the only newspaper published in the colony. Its columns contained, beside a preponderance of local news, the latest advices from England and the Continent not more than a month or two out of date, the fortnightly mail from the North and the monthly post from the South, dignified commentaries on current topics, and advertisements of quaint and curious flavor. Among the locals this one about the old powder-house affair is worth reading:

"This morning, between three and four o'clock, all the powder in the magazine to the amount, as we hear, of twenty barrels, was carried off in His Excellency the Governor's wagon escorted by a detachment of marines from the armed schooner '*Magdalen*,' now lying at Burwell's Ferry, and lodged on board that vessel"—whereupon "the whole city was alarmed and greatly exasperated." In a later issue, account is given of indignation meetings among the citizens, and the full text of a long-winded and eloquent address of remonstrance by the Hon. Peyton Randolph and a deputation, upon hearing which Lord Dunmore flies into a fine rage, and talks of burning the town.

A few days after, we read, the people seize all the arms in the powder-house, and His Lordship sends over to the "*Fowey*," lying at Yorktown, for troops. A squad of soldiers are marched over to Williamsburg, and mount guard on Palace Green before the Governor's house. The "*Fowey's*" captain meanwhile has informed Mr. Thomas Nelson, the principal citizen of Yorktown, that in case the Williamsburgers attack his men the guns of the "*Fowey*" will open upon Yorktown without further warning. The warlike aspect of affairs finally reaches a climax when news is brought that Patrick Henry is marching on the capital, at the head of 5,000 men, to demand redress of these tyrannous abuses. In the last chapter of the story Lord Dunmore pays the value of the powder, and Mr. Henry's forces disband and return to their homes.

The powder-house was built by Alexander Spottswood early in the eighteenth century. This Governor is said to have done more for the general improvement of the colony than any of his predecessors. He was the son of a distinguished Scottish cavalier who had died upon the scaffold for devotion to his King. A brave soldier—he served, it is said, on the staff of Marlborough—and a most accomplished gentleman, Spottswood possessed administrative abilities of a high order. His policy of peace with the Indians was eminently successful, and his project of requiring the chiefs of tribes to send their sons to be trained in the schools of the whites was productive of great good.

[1] Continued from No. 703, page 281.

The most picturesque incident of Governor Spottswood's rule was his leading a party of young explorers from Williamsburg across the Alleghanies and into the unknown regions beyond. It was a royal frolic, and in about six weeks the expedition rode back covered with glory and stocked with romantic stories of the marvels of that *ultima Thule*, the beautiful Valley of Virginia. Spottswood dubbed his young adventurers "Knights of the Horseshoe," and before disbanding the company he gave them each a golden horseshoe to be worn thereafter upon the lapel in memory of the affair. King George hearing of these brave doings intimated his gracious pleasure by sending over to Spottswood a little jewelled horseshoe and a baronetcy.

On leaving office the Governor retired to his country-seat at Germanna, whither came Colonel Byrd, of Westover, in due course, to visit his old-time friend, finding "Colonel Spottswood's enchanted castle on one side of the street and a baker's dozen of ruinous tenements on the other side; there was, also, a chapel about a bow's-shot from the Governor's house, at the end of an avenue of cherry-trees," and the Governor's iron foundries, the first in the colony.

The old powder-house, to return from our little digression, is a tall eight-sided brick tower crowned with a high conical roof. The double wall has fallen in on one side and bulges badly on the other faces, the decaying roof-timbers threaten to collapse, and the handsome wrought-iron finial leans dismally askew. The old "powder-horn" is almost a wreck, indeed. The surroundings are not what one could wish for so interesting a relic; in fact, the old magazine stands in a stable-yard, and is partly hid from the view of the passer-by on Duke of Gloucester Street by tall and very unbeautiful board-fences. A movement is on foot to purchase the building, with a small plat of ground about it, from the present rather unappreciative owner. When this much may be accomplished, it is proposed to rebuild the fallen wall with the old bricks which lie where they fell, to tie the walls securely, to support the roof with some auxiliary framing, and so to arrest the threatened collapse of the tower. But a small sum will be needed to carry out the work.

The subsequent use of the "powder-horn" has not been decided upon, but it has been suggested to use it as a museum of Continental relics. It would add to its interest if its ancient character of an armory could be preserved, and a collection of colonial and revolutionary arms and munitions of war stored therein. In due course the scheme will be more definitely stated in this journal, and, perhaps, assistance of a very modest character besought from its readers who are lovers of things quaint and beautiful.

JAMESTOWN.

The road from Williamsburg to the ancient site of Jamestown, assuredly not among the best of roads, passes out of the town by the campus of old William and Mary, and, soon leaving behind the straggling houses, bears off toward the southwest over a rolling country. Plunging into little valleys, scaling steep, short hills, winding through belts of the forest primeval, or diving into dark, damp places where gnarled roots and stumps combine with mud-holes of amazing muddiness to produce an interesting variety of sensations, the old road meanders on toward the river, growing ever worse. Descending at last into a reedy marsh of broad extent, which is crossed upon a bed of roughest corduroy, bearing evidence of complete submergence at high water, and suggestive of being a very uncomfortable place on a dark night and a full tide, and on the further side of the marsh going over a shaky bridge which spans the inside channel of the river, the road arrives upon the historic soil of Jamestown Island.

From this point there formerly stretched to the mainland a narrow neck of land, where readers of colonial history will remember Sir William Berkeley and his motley troop from Accomack making their famous stand against the invading army of the rebel Bacon. But the isthmus is long since sunk out of sight, and now the yellow waters of the James lap all sides of the former peninsula. The island contains nearly seventeen hundred acres, lying in a long, narrow strip of land, two-thirds of whose entire area is marsh subject to overflow. Near the western end of the island is the crumbling, mossy, ivy-grown ruin of a brick church-tower, about all that is left of the ancient place. Standing in a copse of fine old trees, the ruined tower is very picturesque, and has an interest in itself apart from that which clings to it as the oldtime place of worship of that wonderful band of adventurers who founded Jamestown, the first permanent English settlement in America. The tower is eighteen feet square, and is pierced on two of its sides by high, round-arched openings. It is built of a small, dull-red English brick laid in the Flemish bond.

Beyond it the foundations of the old church are traceable, covering an oblong square of twenty-eight (28) by fifty-six (56) feet, and close by is a mossy, crumbling wall built in the latter part of the eighteenth century from the ruined wall of the old enclosure around about one-third of the original churchyard. Within are some ancient tombs, upon which one deciphers, under the moss and rime, quaint epitaphs of old Amblers and Jacquelines, Sudwells and Lees. Of these, the Jacquelines and Amblers for many generations were the principal owners of the island, while the Lees and Sudwells were of Green Spring, some few miles distant, and famous as the home and place of retirement of that staunch old royalist, Sir William Berkeley. When the worshipped head of his august master, Charles, fell on that dismal morning in 1649 at Whitehall, the old cavalier, his governorship given to the hated Roundhead, his idol dead, the faith for which he had lived and would gladly have died, the *jus divinum*, trampled under foot by clods and boors, found in that peaceful rural life, in the company of his wife and friends at his modest house at Green Spring, a balm for all his wounds. Here he waited and watched events, through those long, stern years of the Protectorate, until old Noll was gone and the son of Charles had come unto his own again, when the fierce old knight held the reins once more over the young colony. Berkeley died in England in 1677, leaving Green Spring to his widow, who afterward married Colonel Philip Sudwell.

"Something special in the way of notice is due to the condition of the tombs of Commissary and Mrs. Blair, the latter being the daughter of Philip Sudwell, of Green Spring, who married Sarah Grymes, of Middlesex. The tombs were placed side by side, and were very heavy and strong. The platform, sides and ends were of white freestone, and the interior filled with bricks well cemented. The top slabs, on which the inscriptions were made, are of dark ironstone or black marble. A sycamore shoot sprang up between the graves, and is now a large tree. In its growth it embraced, on one end and on the top, the tomb of Mrs. Blair, one-third of which lies embedded in the body of the tree and is held immovable. All the interior, consisting of brick, and two of the side stones, have been entirely forced out of their places by the tree, and lie scattered around, while the dark ironstone is held in the air three feet above the surface of the earth, fast bound by the embrace of the body of the tree, into which it is sunk between one and two feet, the inscription being only partially legible. On the other side, the whole tomb of Commissary Blair has been forced from its place by the roots and body of the tree, and is broken to pieces in all its parts." This account of the old graveyard is from Bishop Meade's "*Old Churches*," and the date of the ruined tower is discussed at some length by the same eminent authority, who says:

"As there are conflicting opinions concerning the date of the erection of this old church — some affirming that what we see are the ruins of that which was destroyed in Bacon's Rebellion, while others affirm the building of a new one after that event — we will briefly state the facts bearing on the case. The history of the succession of the Jamestown churches is as follows: The first place of worship, as described by Captain Smith, was made of the awning, or old sails, taken from vessels and fastened to trees. The second was a very plain log building, which was burned down in the second or third year of the colony, during the ministry of the Rev. Mr. Hunt."

In his "*History of Virginia*," Captain Smith, himself, writes at some length about the church and its pastor:

"The log church first erected was burned down the following winter with many other houses. Mr. Hunt lost all his books and everything else but the clothes on his back. Yet none ever saw him repine at his loss."

Robert Hunt came over in 1606 with the first company, and was by all accounts a most noble character.

"Upon any alarm he was as ready at defence as any, and till he could not speak he never ceased to his utmost to animate us continually to persist."

The "Advertisements for the Unexperienced Planters of New England or Elsewhere, etc.," a pamphlet published by John Smith in 1631, contains a more detailed account of the churches during his stay in the colony:

"When I went first to Virginia, I well remember, we did hang an awning — which is an old sail — to three or four trees, to shadow us from the sun; our walls were rails of wood, our seats were unhewed trees till we cut planks, our pulpit a bar of wood nailed to two neighboring trees; in foul weather we shifted into an old rotten tent, for we had few better, and this came by way of adventure for new. This was our church till we built a homely thing like a barn, set up on crotchets, covered with rafts, sedge and earth; so was also the walls. The best of our houses were of the like curiosity, but the most part far much worse workmanship, that could neither well

defend wind nor rain; yet we had daily Common Prayer morning and evening, every Sunday two sermons, and every three months the holy communion till our minister died. . . ."

During Smith's survey of the Chesapeake, not the least of his great achievements, the Indians burned the church. He had it rebuilt at once upon his return. "Now the building of the palace was stayed as a thing needless, and the church was repaired."

Of the further history of the churches, Meade says: "The third was a larger and better one, probably of wood, built during the presidency of Captain Smith, and in a ruinous or neglected condition when Lord De La War arrived, in 1611," who immediately ordered that the church be thoroughly repaired. Strachey, Secretary and Recorder of the colony, gives this description of it: "It is in length three-score foot, in breadth twenty-four, and shall have a chancel in it of cedar, a communion-table of black walnut, and all the pews of cedar, with fair, broad windows, to shut and open — as the weather shall occasion — of the same wood, a pulpit of the same, with a font hewn below like a canoe, with two bells at the west end. It is so caste, as it be very light within, and the Lord Governor and Captain-General doth cause it to be kept passing sweet, and trimmed up with divers flowers, with a sexton belonging to it. Every Sunday, when the Lord Governor and Captain-General goeth to church, he is accompanied by all the counsellors, captains, other officers and all the gentlemen, with a guard of Halberdiers in his Lordship's livery of fair red cloakes, to the number of fifty, on each side and behind him. His Lordship hath his seat in the Quoir, in a great velvet chair, with a cloth, with a velvet cushion spread before him, on which he kneeleth, and on each side sit the council, captains and officers, each in their place, and when he returneth home again he is waited on to his house in the same manner."

"This was doubtless the same," says Meade, "in which Governor Yeardley, with the Councillors and Burgesses, held their legislative session in 1619; and, as we read of no other church being built between that time and 1676, when the town and church were burned down by Bacon, it is most probable that this was the building. In opposition to the theory that the present are the ruins of the old church which was burned in the rebellion, is the fact that the dimensions of the church which Smith built and Lord De La War repaired were different from the one whose ruins are now seen. The dimensions of the former were twenty-four by sixty; those of the latter twenty-eight by fifty-six. Other circumstances there are which render it almost certain that another church had been built since the destruction of the one by Bacon. Not only was there a goodly number of families residing in the place for some time after this, but the Court-house and House of Burgesses were there until the removal of the seat of government to Williamsburg after the year 1705. Although the governors may have lived at Green Spring, yet some of the officers of the Government belonging to the port and legislature were there; and it is not to be supposed that they would live for thirty years without a church."

Our reverend author goes on to cite the circumstance of Governor Andros presenting communion-plate to the Jamestown Church in 1694, that a silver font was given to it by the Amblers, which is still in evidence, and that no marks of fire are discoverable about the ruins, and he finally concludes "that the ruins which we now behold are those of a church put up since the rebellion of Bacon in 1676." As one sees the old tower standing, dismantled, but beautiful, among the ancient, stately trees, memory almost unconsciously tries to rehabilitate the times and the men who have made the place famous in the world's history. Foremost of them all stands forth the grand plebeian name of John Smith, the chief actor in the settlement of Virginia. There is hardly in all history a figure more picturesque than that of this indomitable man. His life was a romance, and full of marvel. Dying quietly in London in 1631, he sleeps in St. Sepulchre's, where a stone bearing his arms, his three Turk's heads, and his motto, "*Vincere est vivere*," is to be seen before the communion-table. A tablet to his memory, engraved with a sonorous epitaph, beginning:

> "Here lies one conquered that hath conquered kings,
> Subdued large territories, and done things
> Which, to the world, impossible would seem."

was destroyed in the great fire of London in 1666.

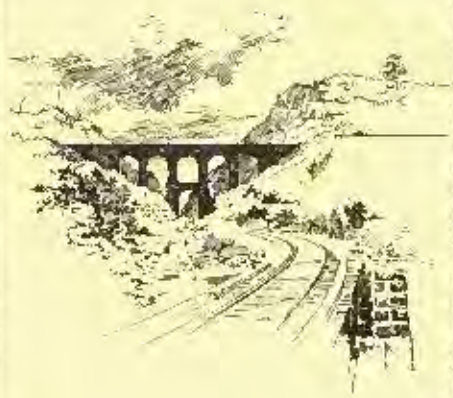
About the only memorial of Captain Smith, and at the same time the only specimen of the architectural achievements of the first settlers to be found in Virginia, is the chimney of the log-house built by Smith for Powhattan at Werowocomoco. The stone of which the chimney is built appears to be a shell rock. There is a great fireplace, eight feet wide, four feet deep and six feet high. Before many years the rapid encroachments of the river will have undermined the ruined tower, and the last relic of Jamestown will sleep beneath Powhattan's turbid flood.

A. B. Binn.

[To be continued.]

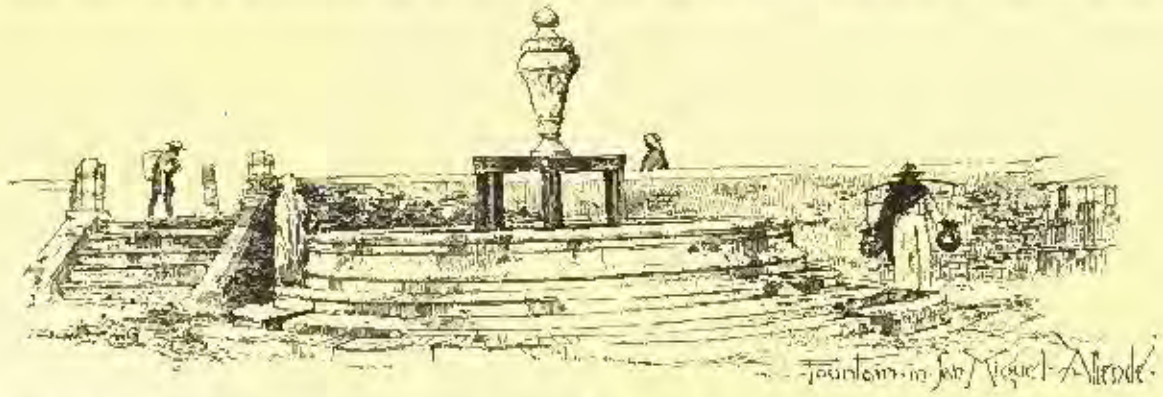
AUTUMN JOURNEYS IN MEXICO. — VI.

QUERÉTARO.



EVERY one who has heard of Mexico has some idea of Maximilian and that he was in some way connected with the political history of the country. And all who have heard of Maximilian know that he met his sad fate in Querétaro. Consequently every tourist in Mexico is strongly inclined to make a pilgrimage to Querétaro in the interests of an historical knowledge which, in most cases, is limited to the Spanish Conquest and the death of Maximilian. But for this, few tourists would ever see that city, though once attracted to it by affection for the amiable Austrian whose melancholy end endeared him to the world, a great deal of interest is to be found there.

It is a beautiful city, in a lovely situation. As one surveys, from the Convent de la Cruz, (where Maximilian had his headquarters), or from the Cerro de las Campanas (the Hill of the Bells), where he laid down his sword with the sad words, "I am no longer an Emperor," and where he was afterwards executed, the city with the picturesque towers of its fifty-six churches, the broad level fields which surround it, all under cultivation, and the beautiful hills which close it in on every side, one may suspect that the Austrian Archduke, who was already tired of the Imperial task he had undertaken,



disgusted with the treachery of his pretended friends, and sorrowing over the loss of his beloved Carlotta, found other attractions in Querétaro than its ecclesiastical strength, and the promises of the Imperialists who thronged the town. For Maximilian was eminently æsthetic. He was a far better judge of scenery than of human character or of political probabilities.

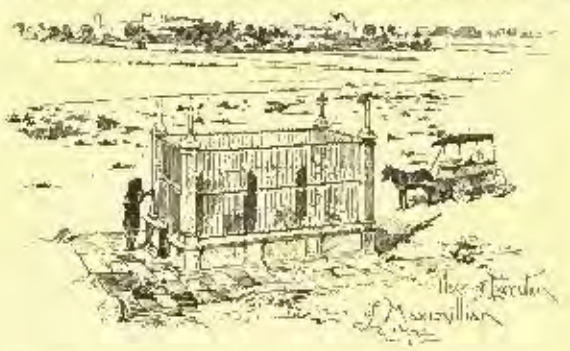
He used a happy expression, however, when he called the place "the mouse trap." After he had established himself in the town, the Republican armies began to gather from every quarter. In a short time they had a line of artillery upon the hills encircling the valley. Then followed the siege with all the horrors which always pertain to a seige: the treachery of Lopez, the surrender, the farcical trial, the heroic death. These are the subjects upon which one reflects as one stands upon the Curro and looks out over Querétaro.

Surely Maximilian left his impress upon the city. It is impossible to dissociate his memory from the place. The Church of the Cross (de la Cruz) still stands, so does the old monastery in which the Emperor was held a prisoner. And the town is full of staunch Imperialists still, who warmly cherish the memory of their fallen chief. Some years ago they petitioned the government for permission to erect a memorial of their unfortunate Emperor. The government would permit only a mark to be placed upon the *site of the*

[Continued from No. 703, page 282.]

execution. The memorial erected in accordance with this reluctant concession is a model of good taste. Three blocks of feldspar, of a pinkish hue, such as is found in quarries in the neighborhood and is extensively used for building purposes in Querétaro, mark the spot where Maximilian and his two brave companions in arms and in death, fell. They are simply inscribed, Maximiliano, Miramon, and Mejia, respectively, and each bears the fatal date, "*Junio* 19 *de* 1867." They are enclosed by a high iron railing upon a stone base, supported by corner posts of the same colored stone. Each post is surmounted by a plain Roman cross.

There is at least one object of especial architectural interest to be found in Querétaro. It is the stone aqueduct which supplies the city with water from springs five miles distant. The aqueduct leads up to the mountains two miles away, and a tunnel completes the distance. Some of the arches in this aqueduct are ninety feet high. Good masonry was executed in those old days in Mexico, and the mortar between the large stones which compose this aqueduct shows no signs of crumbling, though the work was done over a hundred and fifty years ago. The cost of the work is set down as $124,000, and the greater part of the money was furnished by Baltasar de Zuniga, Marques de Valero de Aguila, who was Viceroy



of Mexico in the years 1716 to 1722. It was not every Spanish Viceroy who looked out for the requirements of his subjects as well as Zuniga, and the gratitude of the city has been expressed by erecting a monument to his memory in the plaza. Thus Querétaro perpetuates the memory of two men distinguished in the history of Mexico. One was the unfortunate Austrian who undertook to "regenerate Mexico." The other was the thirty-sixth viceroy. It might be suspected that it is not a very loyal republican city: it is one of the Church's strongholds, and the Church and the Republic "agreed to disagree" some time since.

Querétaro is reached from the capital by means of the Mexican Central Railway, which places many and great opportunities at the disposal of the tourist, for making autumn journeys in Mexico. A former correspondent has embraced these opportunities and given the readers of *The American Architect* the benefit of his busily employed pen and pencil in Guanajuato, Lagos, Chihuahua, and elsewhere. This railway brings to the tourists' especial notice one of the most stupendous works of engineering to be found anywhere. It is the famous Tajo de Nochistongo, or drainage-cut, designed to drain one of the lakes of the Mexican Valley which imperiled the City of Mexico.[1] It was first constructed as a tunnel four miles in length. Failing to accomplish its work in that form it was subsequently opened as a deep cut. When the Mexican Central Railway sought an entrance through the mountain wall surrounding the Mexican Valley, the Tajo de Nochistongo, having served its original purpose, furnished the desired means of ingress. The railway runs along a shelf excavated upon the side of the cut, and affords an excellent opportunity to examine this interesting relic of the engineering skill of the seventeenth and eighteenth centuries, without leaving the train.

In a short time lateral branches of this railway will be opened, connecting the Gulf with the Pacific, Tampico with the San Blas, and opening up other interesting portions of Mexico for the inspection of tourists, and provide opportunities for other autumn journeys in Mexico, without necessitating roughing it to the extent of employing the primitive modes of travel, the *litera*, the pack mule, and the *diligencia*.

Arthur Howard Noll.

[The end.]

ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF G. G. HAVEN, ESQ., LENOX, MASS. MR. J. D. JOHNSTON, ARCHITECT, NEWPORT, R. I.

[Gelatine Print, issued only with the Imperial Edition.]

[1] See No. 604, of *The American Architect*.

HOUSE FOR L. W. ALLEN, ESQ., YORK, PA. MR. D. F. WILLIS, ARCHITECT, YORK, PA.

THE materials of this house are: native dark-blue limestone in large blocks with red-brown pointing for first story. Second story, shingles, light-red stained. Roofs, dark-blue slate. Windows filled with 26-oz. Chance sheet crystal glass. Interior, sand-finished walls for oil painting, hard-wood floors, selected ordinary sawed oak and rift or comb-grained selected *North* Carolina pine.

PERSEVERANCE LODGE NO. 46, KNIGHTS OF PYTHIAS, CHESTNUT HILL, PHILADELPHIA, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

THE building is pointed stone, contains two stores, two dwellings, a large lodge-room and open-timbered roof with ante-rooms in the third story. It has been contracted for at $12,500.

A FAMILY HOTEL, MINNEAPOLIS, MINN. MR. H. M. JONES, ARCHITECT, MINNEAPOLIS, MINN.

THIS building is built of brick and brownstone.

MEMORIAL LIBRARY, ACTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

COMPETITIVE DESIGN FOR CHURCH, CLERGY-HOUSE, AND SCHOOLS FOR TRINITY CORPORATION, NEW YORK, N. Y. MR. H. M. CONGDON, ARCHITECT, NEW YORK, N. Y.

HOUSE AND STABLE, HAVERFORD COLLEGE STATION, PA. MR. W. EYRE, JR., ARCHITECT, PHILADELPHIA, PA.

PARIS EXHIBITION.

IN my last article or prologue to the studies which we are going to make on the Exhibition of 1889, I passed in rapid review the Universal Exhibitions which have preceded it. Today, that of 1889, has been opened for more than a month, and the echo of its colossal success has certainly reached you. The magnificent fête which marked the inauguration on the 6th of May, at which 200,000 persons were present, has been described in all the newspapers, and I need not dwell on this point. I only wish to lay stress on the enormous number of paying visitors during the month of May, namely, 2,208,045. In 1878 there were only 1,269,675. This difference was all the more remarkable, for in 1878 the Exhibition was opened the 1st of May, and this one was opened only on the 6th.

We are going to enter the Exhibition through the Trocadéro, and the glance that we shall cast over the Champ de Mars will give the most exact idea of the general arrangements of the buildings. But, first, let me speak a moment of the classification adopted, which differs slightly from that of 1878. The creation of special classes for hygiene, viticulture and pisciculture are good minor changes. In the language adopted for exhibitions, the manifestations which respond to a general idea is styled a "group," and a "class" is each special order of the manifestation. Group 1 is consecrated to the fine arts, and is divided into three classes. Group 2, to education and educational supplies, and to the liberal arts. It is divided into twelve classes which have a connection, of course, with the fashioning and enlarging of the human intelligence. Group 3, furniture and accessories, contains twelve classes. Group 4, tissues and clothes, contains eleven classes. We have next group 5, the extractive industries, raw and manufactured products. Group 6, tools and processes of mechanical industry, and electricity. Group 7, alimentary products. Group 8, agriculture, viticulture, pisciculture, and group 9, horticulture.

Now let us begin our visit and enter the Trocadéro. The gardens of the Trocadéro are occupied by the exhibitions of horticulture and arboriculture, and contain no other structures save a restaurant, the pavilion of Public Works, the very original one of Waters and Forests, and several little kiosks and greenhouses. From beyond the Pont de Jena the Eiffel tower raises its giant height, and lets us see between its arches the palaces and gardens on the Champ de Mars. At the back, like the horizon line, lies the machinery-gallery, cut in two parts by the elegant silhouette of the central dome of the palace of the industrial sections. On the right and left, corresponding with the galleries of the foreign sections are the two palaces of the liberal and fine arts, whose domes glitter in the sun.

Copyright, 1889, by Russell Sturgis.

A FAMILY HOTEL, MINNEAPOLIS.

Heliotype Printing Co., Boston.

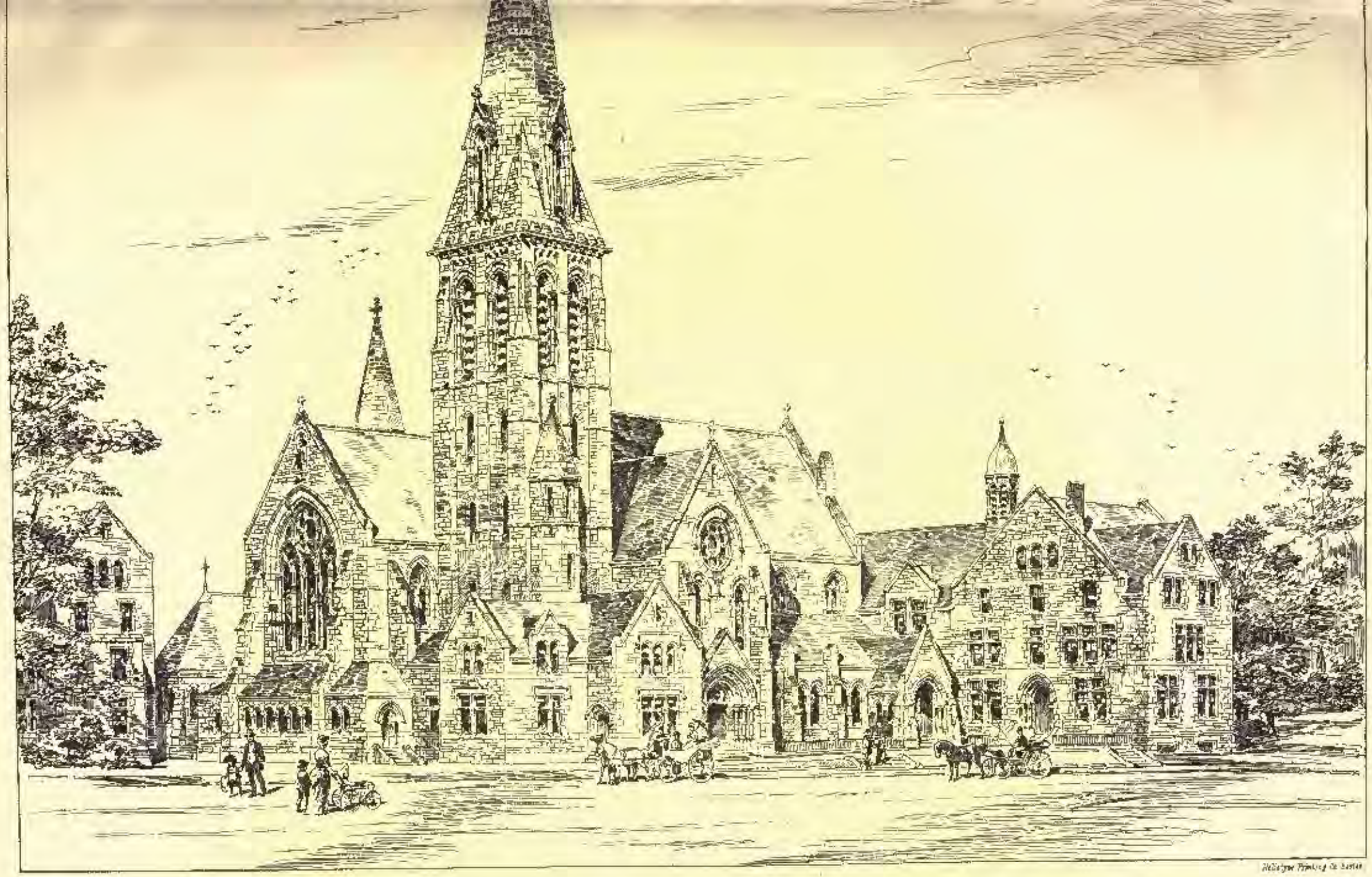
Heliotype Printing Co. Boston.

— LODGE BUILDING —

For — PERSEVERANCE LODGE, No 46, KNIGHTS of PYTHIAS.

AT CHESTNUT HILL, PHILA.

GEO. T. PEARSON, ARCHITECT, PHILADELPHIA.



H. Mc. Congdon, Archt.

Perspective View on 92nd St

Dilexi decorem Domus Tuae

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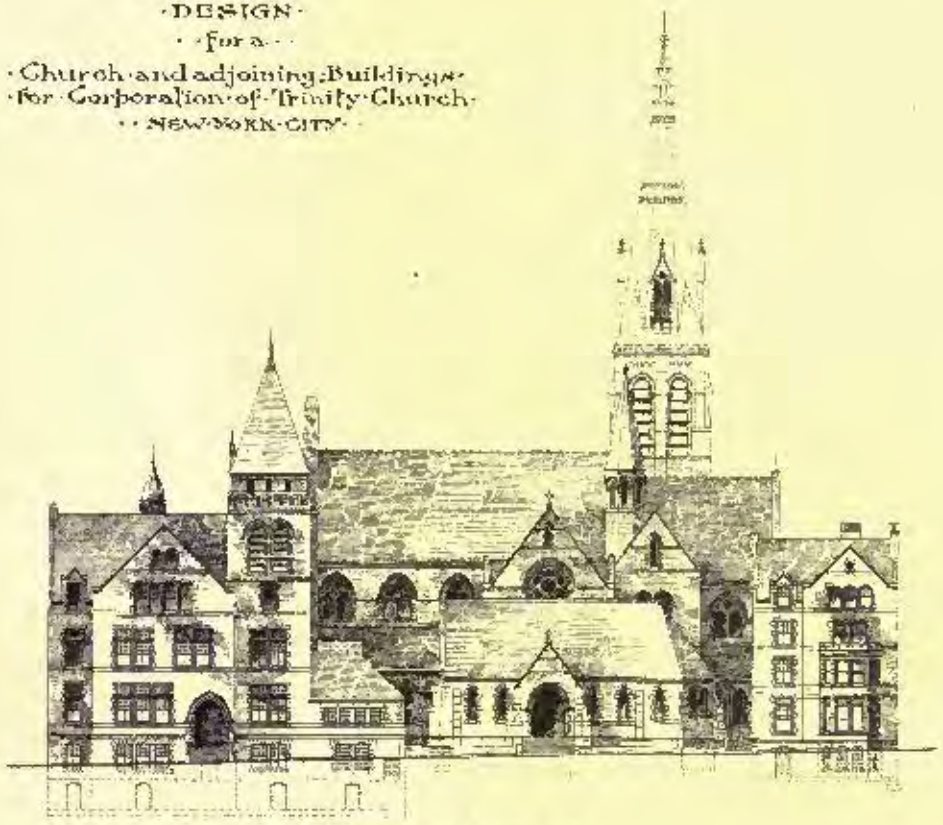
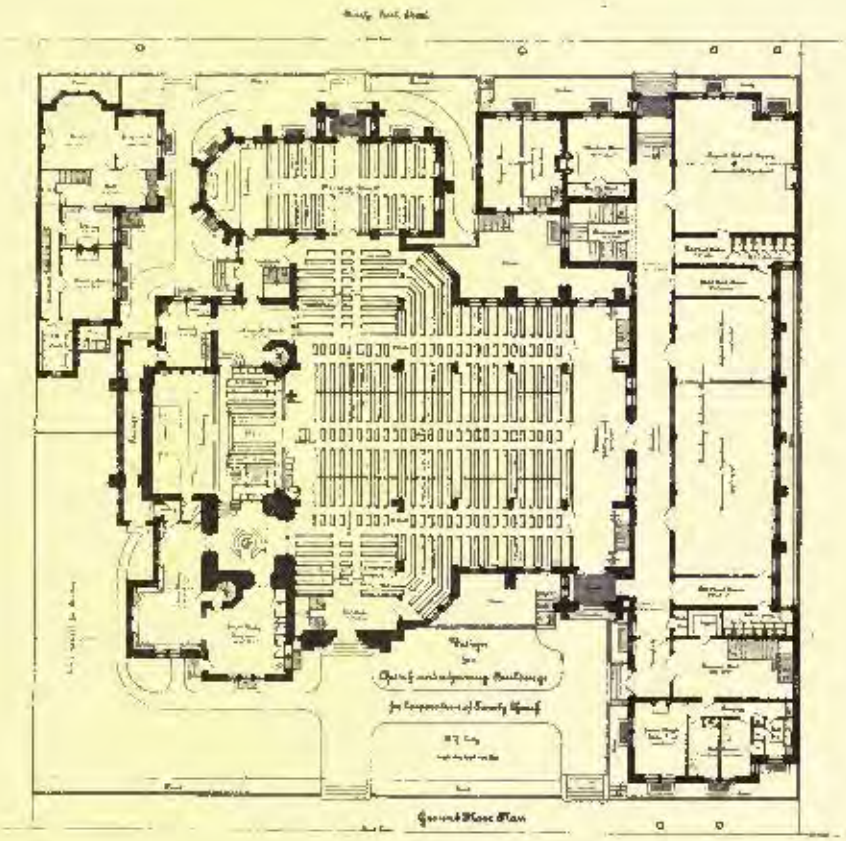
Competitive
DESIGN
For a
Church and adjoining Buildings
for Corporation of Trinity Church
NEW YORK CITY



South Elevation on Twenty first Street



Ground Floor Plan

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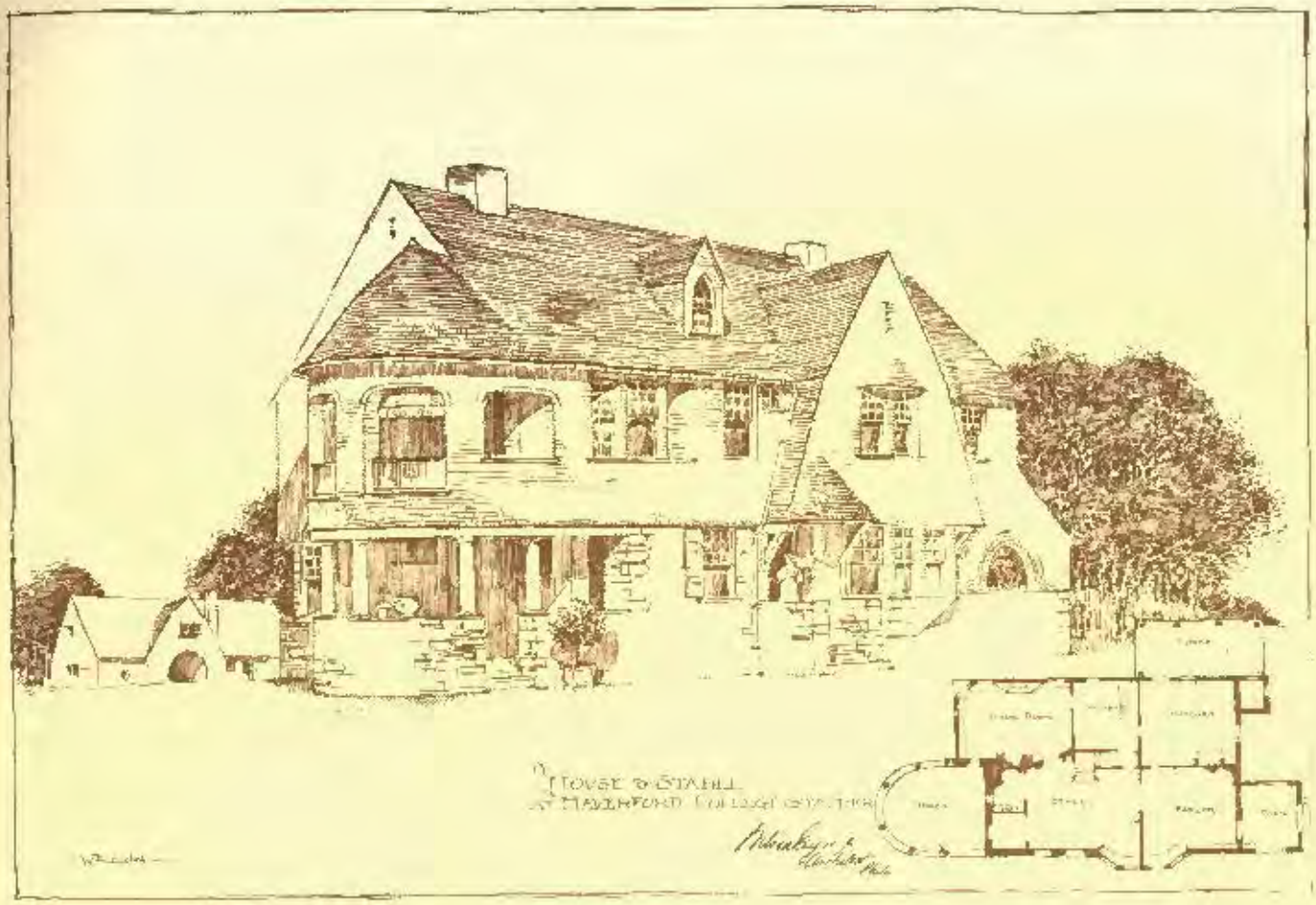

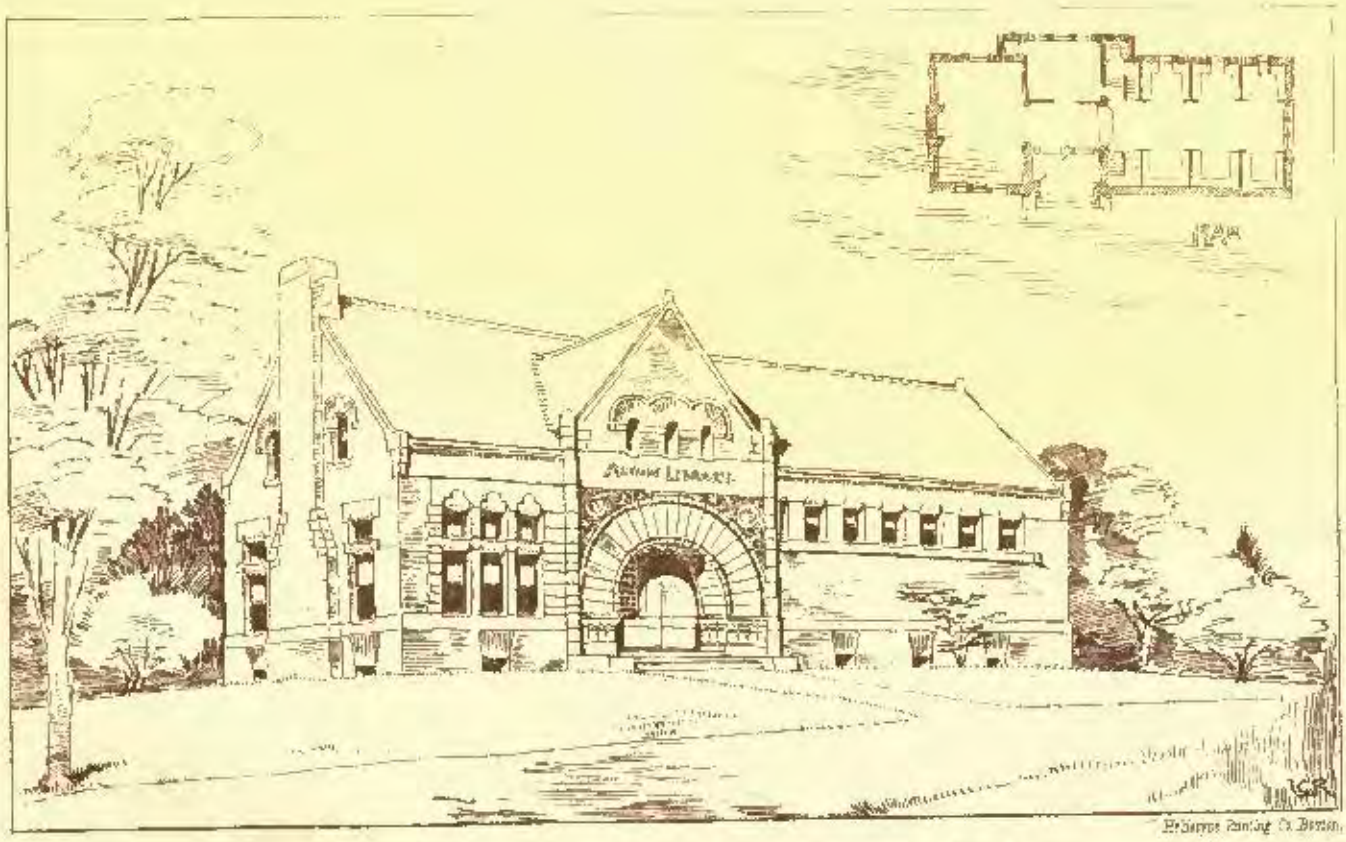

MEMORIAL LIBRARY AT ACTON MASS.

H.H. Hartwell & Wm. C. Richardson, Archts. Boston Mass.

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HOUSE OF G. G. HAVEN, ESQ., LENOX, MASS.

J. D. JOHNSTON, Architect.

At the foot of the great tower, on the terraces, in the gardens, on the bank, everywhere in fact, is a very ant heap of picturesque constructions, projections, pavilions, towers, pointed roofs and domes, which declare themselves against the clear sky or stand out on the greensward. In the first plane, perhaps in a little too regular form, we note the marshalling of the "history of the dwelling-place." On the left, along the quays are the galleries of agriculture stretching out to join the esplanade of the Invalides, the colonial exhibitions and those of history and hygiene. Passing under the tower without stopping, since it is not yet finished, and the elevators only operate as far as the first story, let us direct our steps towards the central dome, admiring as we go the beautiful monumental fountain which occupies the middle of the garden. This fountain, the work of M. Coutan, represents the vessel of progress bearing the City of Paris who stands erect surrounded by Fame, with her trumpet, and allegorical figures personifying modern life. The fountain consists in all of twenty-four figures, fifteen of which are colossal, and from 3.60 to 4 metres in height. The silhouette is agreeable, full of movement and very decorative.

We arrive thus before the central dome, which serves as triumphal entrance to the industrial sections. This entrance is declared by a great bay cut at half its height by a projecting balcony. The coving is decorated with cartouches and medallions in brilliant colors. On each side is a pylon crowned by an enormous head in the round. A frieze of the assemblies of cities occupies the length of the pediment, which is crowned by the ship of the City of Paris. The dome is decorated with *cabochons*, with cartouches, winged sphinxes, and lions' heads and garlands. A monumental statue crowns it, which represents France distributing crowns to the nations. This is the work of M. Delaplanche. Two groups, one by M. Gautherin, "Commerce," and the other by M. Gauthier, "Industry," placed at the foot of the pylons, complete this luxurious composition, which we can only criticise when we examine very near at hand a decoration which is somewhat exaggerated and heavy in its details. This dome has been built by M. Bouvard, architect of the galleries of the industrial section. Now the interior is altogether magnificent. Its diameter is 30 metres and its height 50 metres. An enormous frieze of figures by M. Lavastre, the decorator of the Opéra, decorates the entire circumference above the balcony of the first story, and represents all the nations coming to pay their respects to France at the Exhibition of 1889. The yellow tone of the interior decoration of the dome has a very brilliant and warm effect. It is magnificent. Before us stretches the Gallery of Honor 30 metres wide and 175 metres long, which leads to the machinery-gallery. Before entering, let us cast a glance at the exhibition of national manufactures, which occupies the lower floor and first story of the central rotunda. The ground-floor is occupied by the exhibition of Sèvres, arranged on two platforms or in niches of green, where are arranged decorative vases. One of the important pieces is the Paon, 3.54 metres in height by 1.90 in breadth, and all white. At the right and left two halls, 11 metres by 20, contain the tapestries of Beauvais. On the first floor, which we reach by four staircases, is found a circular balcony 6 metres wide, hanging over the vestibule of the dome, on which is to be established the retrospective exhibition of ceramics. The balcony forms a loggia to the grand gallery of 30 metres, and opens also on the garden. Two halls of similar dimension as those on the ground-floor contain the exhibition of Gobelins. Amongst the most beautiful of pieces I will mention the decoration of M. Galland for the Hall of Apollo, in the Palace of the Elysée. It consists of seventeen hangings, which bear a succession of allegorical figures, the Muses, the Poems and Pegasus as a central panel. Next, the panels of M. Lavastre, Science; M. Lefevre, Nymphs and Bacchus; M. Chardin, Sylvan Music and Warlike Music; of M. Urbain Bourgeois, Innocence; and, finally, the work of Messieurs Desgoffes, Paul Flandrin, Lauroyer, Bellel, Muloisel and Curzon. The compositions of M. Ehrmann for the National Library must also be remarked: for the first story, two figures representing "Print" and "Manuscript," and for the lower floor the grand panels of "Literature," "Science" and "Arts." Opposite to these and of the same dimensions, that is, 8 metres by 5, is the magnificent tapestry "the Goldlaughter of the Fairies," a composition by M. Mazerolles, the artist decorator, who has just died. To complete the exhibition of national manufactures, there must be mentioned the very beautiful pieces called "Savonnerie," which derive their name from the State manufactory where this kind of product was made for the first time. It was at the beginning of the seventeenth century that a Frenchman, named Pierre Dupont, suggested to Henry IV the idea of installing at Paris a carpet factory after the Oriental style. The establishment was created and occupied during a century, on the Quai de Billy, a building which had formerly been used as a soap factory. Hence the name "Savonnerie." In 1728, this manufacture was united with that of the Gobelins. The workshops of the Savonnerie are represented at the Exhibition by five allegorical panels, which are destined to decorate the Palace of the Elysée, and symbolizing, after the composition of M. Lameire, Science, Art, Industry, War and Maritime Affairs.

Entering the 30-metre gallery, the first thing which strikes our eyes is an isolated mosaic door. It was made at the National manufactory of Mosaics, at the Gobelins, after the composition of M. Paul Sédille. On each side two female figures drawn by M. Luc-Olivier Merson, symbolize "Tapestry" and "Ceramics." This door, whose colors are a little vivid, seems small in the midst of this grand gallery, and the general effect of it is not very elegant, but it forms in the centre of the gallery a point of departure for the most interesting and rich specimens of different industries represented in different classes. Among the most curious exhibits, I will mention the window of ceramics and glass, the work of M. Emile Gallé, of Nancy; a church altar in goldsmith's work, by M. Poussielgue; a little panel in porcelain and Limoges faïence, by M. Charles Haviland; and finally the very important exhibition of Messieurs Thiébaut Bros., which consists of art-bronzes: among its most beautiful pieces may be remarked the model of the equestrian statue of Etienne Marcel, by Idrac & Marqueste, the original of which is at the Hôtel-de-Ville. We likewise see a sufficiently elegant fountain of mosaic work, a fine old piano, by Erard, a window of Lyons silk, and marbles from off the house of Cantini, of Marseilles.

The exhibit of copper-work made by Lavoisière occupies a very important place, and is arranged in an original and decorative manner as a kind of enormous trophy composed of copper apparatus used in distilling and refining. Here may be noted retorts three metres in diameter and tubes ten metres long without seam.

Returning towards the rotunda, let us cast a look on the monumental doors erected by the exhibitors at the entrance of their sections. These doors are almost all magnificent, and the architects of the different classes have entered into rivalry in the matter of style and richness of their compositions. To the right, on leaving the rotunda, we find that of the jewellers, composed of two classical arcades, and with a rather cold general effect. On the other hand, the door to the ceramic section is quite another affair. Constructed by M. Marcel Deslignières, it is wholly of terra-cotta, faïence and ceramic work. It is composed of a grand central arch resting on a strong sub-basement decorated with foliage, after the Italian style; above two niches, one on each side, with female statues symbolizing "Ceramics," by M. Lormier, sculptor, and "Mosaics," by M. Houssin, sculptor. These two statues, all of enamelled faïence, form two superb bits of ceramic work. The tympanum of the arch is decorated with pretty mosaic work on a gold background representing "Earth" and "Fire," symbolized by two female figures. The frieze is decorated with rosettes of faïence in a succession of small arches, and the whole is crowned by a cresting which stops against a motif of figures, with a decorative vase. On each side of the entrance door is a portico of two arches separated by a central column and surmounted by a frieze with figures in faïence forming panels. Two statuettes resting on cuisse lampes, crown the summit of two pilasters, which limit this motif of arcades, and which themselves are surmounted by a decorative panel with a vase above. A balustrade of enamelled lava completes this extremely brilliant whole in a rendering of Italian Renaissance. M. Marcel Deslignières, architect, had as co-laborers in the execution of this doorway our most able ceramicists, Brunet, Boulanger, Gillet, Mortreux, Lebnitz, Muller, etc. After the brilliancy of this doorway, that of the furniture and tapestry section seems severe. This last is, nevertheless, enlivened by two decorative panels by M. Tauhé, which are very luminous in effect.

After the two doors of the horological section, original enough, but not sufficiently studied, by M. Abel Chancel, and that of the bronze section, which is sufficiently commonplace, we find ourselves in front of the doorway leading to the metallurgical section, designed by M. Schmidt. This is one of the best, if not the most successful, in my opinion. It is entirely made with motifs derived from metallurgy and pieces of iron or steel, which are exhibited by the ironworks of Pompey, and in spite of the dryness of each of these elements, taken by itself it forms a whole which is extremely original and even amusing. The consoles in iron spiral springs, the *cartouches* formed of tampions of locomotives of polished steel, the columns, all the decoration, in a word, is obtained without drawing on any matter foreign to that which constitutes the exhibit of metallurgy. Another door composed in the same feeling but less successful, is *vis-à-vis* to it and still belongs to the metallurgical class. It is the work of M. Gruriaut.

Passing more rapidly before the door of forest industries, whose originality is too laboured and becomes *baroque*, and also before that of portable arms, which is too meagre in its decoration, we will stop with pleasure before the door of the woollen-goods department, designed by M. Courtois. Suffice it to say the whole, Renaissance in style, is very decorative and very brilliant in color. It consists of three bays, fashioned by marble columns of a very beautiful violet tone, heightened by gilding on the capitals, and a brilliantly effective central motive composed by M. Tauhé, whom we always find on hand where there is need of ability and fine coloring. The panels, painted by M. Rochegrosse, and representing weaving and dyeing, having a somewhat Japanese effect, complete this door, which is one of the successes of the gallery.

By the side of this, rustling with gold and decorations, is the doorway of the silk department, very academical in design and somewhat severe as a whole, but it has a beautiful ordonnance and does not lack for character.

The last two before reaching the rotunda are less interesting, although there is ability in that of the one ably composed by M. E. Bertrand, who, unfortunately, was afraid of giving too much projection and relief and has fallen into the other extreme.

We have seen the vestibule and gallery of honor, and in another article we will pass through the French industrial section, stopping by preference before the products which are associated with architecture and decoration.

M. BRINCOURT.

THE LOTUS IN ANCIENT ART.[1]—VI.

THE ANTHEMION AND THE LOTUS.

In specifying the Anthemion as a lotus motive, it is important to insist on a historic aspect of artistic and decorative development, which is not apparent in a time of eclectic copying like our own. In a time which has imitated and mixed together the decorations of every national style and of every epoch of history it is not easy to grasp the fact that in the original development of decorative art it has followed a specific course of evolution, in which ornaments of a certain character were confined originally to certain centres, from which they have radiated or travelled in certain directions according to historical causes.

Since the beginning of Greek history, at least, there is one law of decorative evolution for which there is abundant evidence; viz., that each successive style has followed a definite sequence of development from the simpler to the more ornate phases of a given motive. In the architectural decoration of the Renaissance, Gothic and Romanesque styles, every step in the elaboration of the ornamental style argues a sequence in time, and follows a definite development from the simple to the ornamental, from the ornamental to the elaborate, and from the elaborate to the complex, over-burdened and superfluous, after which the style becomes lifeless and fossilized, and finally disappears. The various distinctions in the nomenclature of the English Gothic are simply distinctions expressing this general law. In the ornamental style of the Renaissance between 1500 and 1550, it is sometimes possible for an expert to date the monuments according to the sequence of style in ornament within a given decade. In the Greek vases of the fifth and fourth centuries B. C. similar differences of style enable the expert to fix the dates occasionally within a quarter of a century.

In the case of the Greek anthemion there is a parallel development, and at a certain stage the influence of plant forms distinct from the lotus is clearly apparent. This influence, especially leaf decorations, is, however, later than the close of the fifth century B. C., and the later anthemions are always built upon an elementary scheme which remains the same, and which preserved its simpler aspect through that time, at least.

This elementary scheme is that of two scrolls or spirals supporting a palmette. In architecture, the anthemion form of the Parthenon may be cited as an example (No. 37). Nos. 38 and 39 are from Athenian tombstones of a later date, and may be quoted as examples of the more ornate subsequent development, which, however, adheres as regards the skeleton of the plan to the original scheme of 37.

In defining the anthemion as a lotus motive, it is this elementary scheme which is in question.

Considering the great abundance of examples of Greek decoration in pottery antedating the fifth century, and the relative scarcity of other material, it is clear why pottery examples will furnish the greatest number of transitions and connecting links in the illustration which is required. To reach the second stage of the later anthemion we turn to the pottery of Rhodes. The first stage is illustrated by the pottery of Cyprus. The third stage and complete illustration of the anthemion, as directly connected with the lotus, is at present writing, and within my knowledge, only furnished by the pottery of Melos.

According to the geographical sequence from East to West, and in view of the greater independence of the Rhodian Greeks from Oriental influence, as compared with the absolutely dominant Orientalism of Cyprus, we have a right to expect in the pottery of Rhodes and from its earliest examples a more Grecianized expression of the lotus form. On the other hand, the close relations of Rhodes with the Greeks of the Nile Delta from the time of their establishment in Egypt in the eighth century B. C. would explain that dominance of the lotus in its pottery decoration which the most casual examination will reveal, and which is also the rule for the Greek pottery of Naukratis.

Among the various forms, we select that which is clearly a more Grecianized expression of the Cypriote lotus motive, through which we have found one way to an explanation of the Ionic capital. No. 1 shows, for convenience of reference, a repetition of this now familiar form of ornament. With No. 2 we enter on the first stage of the Greek lotus anthemion. Without any sort of doubt, this ornament is a Grecianized development of the Cypriote voluted lotus. The curling calyx leaves[2] have grown into spirals; the upper portion is a Greek decorative treatment of the simplified lotus form, the whole filled-in with conventional decoration. We have pointed out that the Greco-Phœnician pottery of Cyprus can clearly date its typical examples back to the fifteenth century B. C., at least. There is no Rhodian pottery of the class in question which could be placed earlier than the eighth century with any certainty. Thus the sequence both in time and in geographical relation is a clear one. No. 3 is a variant showing that we are dealing with a Rhodian type, and not an isolated example, and No. 4 is a related motive from a vase found on the island of Thera.

[1] Continued from page 226, No. 698.

[2] Compare the calyx leaves from nature, Cut 6, Article I, "The Ionic Capital and the Lotus."

The palmate portion of No. 4, is part of a lotus-rosette (ovary stigma) and related to the Egyptian lotus palmette as this has been already explained in previous articles.

We are now prepared to take advantage of the Chigri capital No. 5, of the Egypto-Phœnician ivory details of Nineveh No. 6; above all, of the Egyptian palmettes, to which they are related, and whose derivation from the combination of the lotus-rosette (ovary stigma) with the voluted lotus has been previously explained.

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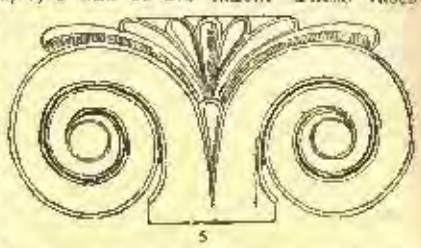
The typical Egyptian forms are repeated here (Nos. 7–14) from preceding articles in order that the vase lotus, Figure 4, may be clearly recognized as a Grecianized and more elaborately decorative treatment of the combination 10 to 14, inclusive, and of the motives 5 and 6.

A parallel is offered by the Rhodian lotus form at 15 as far as the rosette combination is concerned.

Figure 16 offers a typical example of a Rhodian vase of the style from which the details 2, 3, 4 and 15 are taken. These vases belong to a period comprehending the eighth and seventh centuries—probably the sixth as well. The style of decoration in bands of animals—deer, geese, etc., is well recognized as one preceding that in which figured compositions from the Greek myths are represented, although it continued after this later one began. The most archaic vases of this later class were apparently made first in centres nearer the mother country.



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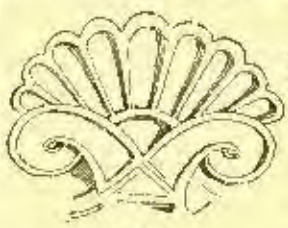
It is from the Island of Melos, or from a pottery centre of manufacture which has so far revealed itself by examples found on that



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Island, that the most archaic class of vases figured with Greek myths derives its examples. Few of these vases are known, but their importance for the history of Greek pottery has been recognized in a special publication devoted to them by Professor Conze, of the Berlin Museum. They are supposed by him to date from the seventh century. The dates of particular pieces, as between the vases of Rhodes and Melos, do not, however, offer cause for anxiety, as it is a matter of general information that in the development of Greek art, local schools were variously formed, and that they frequently perpetuated local types beyond the time of a more perfected art in other quarters. Moreover, the ornaments of the Melian vases are clearly enough lotuses when attention is turned to them, although this has not been noticed in the publication of Professor Conze, or otherwise. In my own observation it was the Melian lotuses which first suggested the lotiform origin of the anthemion. It occurred to me that vases of the

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Rhodian style ought, on account of geographical position, to exhibit connecting links with the lotus forms of Cyprus, and these were then found by turning to Salzmann's publication of Rhodian vases in his "*Nécropole de Camire.*"

In the decorative details from this and other vases of the same class, we meet a development of the lotus form which passes directly over to the Greek anthemion. The transitions are found in details of one and the same vase. There is no difficulty in recognizing in the ornament 17 a doubled lotus—whose spirals are elaborations of volutes similar to those of 4, 3 and 2—which again have been recognized as more Grecianized forms of 1.

In the ornament 18 the relation to 17 is clear. As contrasted with 17 the pointed petals are replaced by the palmette, as in 4 and

15. The general resemblance as regards proportions, and without reference to the spirals, to the Egyptian lotus palmette in gold repeated at 19 is apparent. It is also to be remembered that the Egyptian motives figured at 11, 14 and at 19, are quite frequently found in the ornamented metal-work discovered in Greek, Phœnician and Etruscan tombs, so that a direct influence of such designs on the vase decorators may be easily admitted. The intimate relations of the Greeks, in general, with those of

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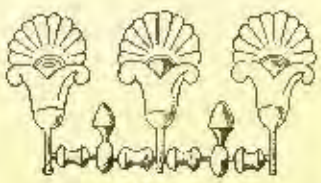
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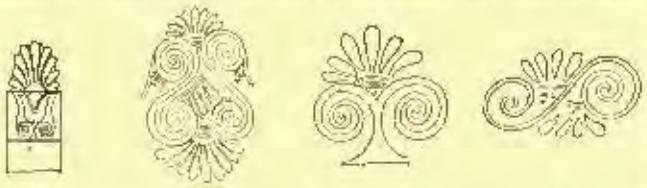
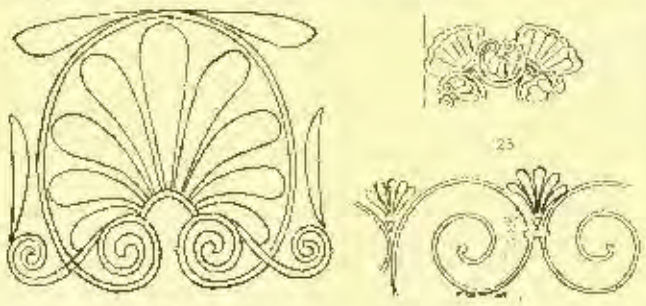
Naukratis would, however, be a sufficient explanation for this and all other Egyptian influences.

As regards the general proportions of the lotus and palmette, and without reference to the volutes, a resemblance may also be traced


20 21 22 23

between a Sicilian-Greek architectural lotus palmette figured by Hittorf (20), and the lotus palmettes 18 and 19.

Our next step with the lotus forms of Melos is decisive, especially in view of the fact that 21 and 18 are figured on the same vase. Two points are to be noticed, the free development of the palmette from the stiffer, more formal, aspect seen at 19, and the inversion of the lower scrolls. The Greek decorative feeling, pure and simple, has captured the lotus palmette, and it appears at 22, another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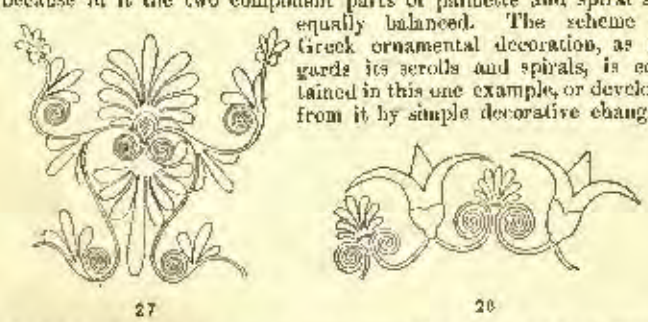
motive from the same vase, in a typical Greek form. This motive exactly resembles the upper portion of 21. It may be compared to the more schematic Rhodian lotus anthemion 4, for indication of the sequent steps by which Greek ornamental art developed from its Egyptian prototypes.

The motive 22 is an excellent type of the Greek anthemion, because in it the two component parts of palmette and spiral are equally balanced. The scheme of Greek ornamental decoration, as regards its scrolls and spirals, is contained in this one example, or develops from it by simple decorative changes,


27 28

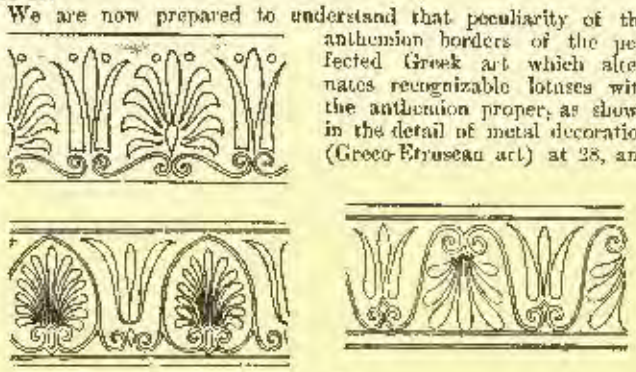
of which the most important appear on the same type of vases.

No. 23 develops from 22 by a simple inversion of one scroll.

By carrying the lower unfinished curves of 22 around and upward till they meet above, we obtain another typical form of the anthemion (24). In this case the balance of dimension between spirals and palmette seen in 23 has given way to an enlargement of the palmette and diminution of the spirals. The same variant appears in union with intermediate palmettes in the detail 25 from a Rhodian vase. Both belong to the perfected art of the fifth century. The contrary alternative of palmette diminution and scroll enlargement is represented by 26, also of the perfected Greek art of the fifth century from a Rhodian vase.

If we add to these illustrations, the detail shown at 27 from a Greek vase found in Italy, we shall have fairly covered the typical cases of the anthemion, all reducible to elements which appear in 22 and 23.

We are now prepared to understand that peculiarity of the anthemion borders of the perfected Greek art which alternates recognizable lotuses with the anthemion proper, as shown in the detail of metal decoration (Greco-Etruscan art) at 28, and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in so many of the borders published by Owen Jones of which a series is shown at 29, Owen Jones's details.

On the hypotheses so far accepted that the recognizable lotus motives of perfected Greek art are Egyptian but that the anthemion is Assyrian, we are required to find some meeting point where the two foreign forms united before they passed to the Greeks. This meeting-point could only be in Phœnician decoration and here all the indications point to a transmission of an Egyptian lotus palmette to Assyria as starting-point of the Assyrian forms. A reaction of the Assyrian palmette on Greek decoration may easily be conceded and very probably took place through later Babylonian or Persian transmission by way of Asia Minor, but at a time when the typical anthemion was already perfected. The main indication that the Assyrian palmette did not influence the early development of the anthemion is the fact that it does not appear on any of the archaic Rhodian and Melian vases which illustrate this development and that the archaic anthemions do not indicate this influence. If the Assyrian form had any influence on the Greek it must have travelled to the Greeks by local stages, and yet the intermediate pottery of Cyprus, and the archaic pottery of Rhodes, are absolutely destitute of any such palmette forms. On the theory of local transmission the influence should be first apparent exactly in these localities. A rare case of Cypriote lotus palmette is shown at 30, the only instance, so far published in the distinctively Cyprinte pottery. The upper portion of this design may be conceived as the preparatory or earlier archaic form of 4, but it has no close relations to the Assyrian palmette.

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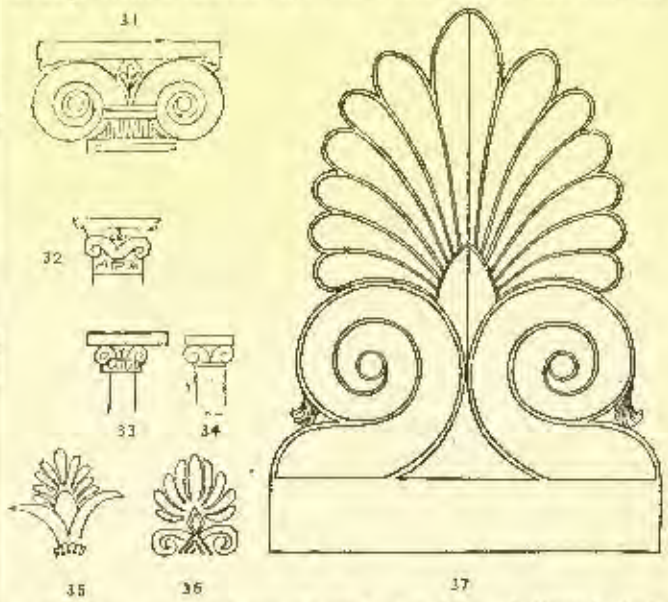
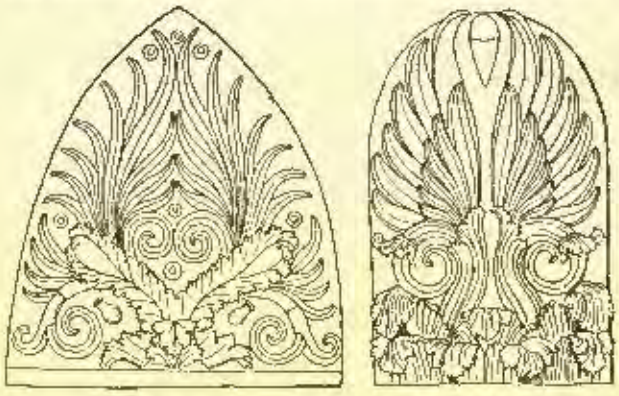
We are forced to conclude therefore that Assyrian and Greek ornamental art are divergent branches of a common tree which was rooted in Egypt and Phœnicia.

As the starting-point of these observations was the Ionic capital we may return to this starting-point to observe once more that only


31 32 33 34 35 36 37

by the views presented can we unify that form of Proto-Ionic in which the central triangle appears between the volutes with the alternate form shown by the capital of Chigri (Neandreia) Figure 5. With this we may now unite the capitals recently published by Mr.

Trowbridge in the *American Journal of Archæology* (81, 32, recently discovered archaic Athenian Capitals, 33 related capital from a Greek vase); The Syrian Proto-Ionic capital of Mashnaka (34) is repeated from the second paper on the Ionic capital for purpose of comparison with these. All are illustrations of the stages by



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which the ultimate Greek form was reached. It is not necessary to assume or demonstrate a graded precedence of time as regards these individual instances. Let them be local or traditional survivals of earlier forms and the argument remains the same. Such survivals may be demonstrated for the anthemion even in the Greco-Roman art as appears by illustrations 35, 36, motives from terra-cotta reliefs in the Campana collection of the Louvre. Wm. H. Goodyear.

[The end.]

BOOKS AND PAPERS.

MR. GILMAN has rendered an important service to social science in collecting in a convenient little volume[1] authentic accounts of all the experiments, successful or unsuccessful, which have been made in sharing business profits between employers and employés, up to the present time, in regard to which information was available. It is easy enough for persons interested in the subject to find elsewhere glowing accounts of the success of this or that particular scheme; but an unprejudiced review of the whole subject, presenting the bad, as well as the good side, is the only thing that is of real use to people who are disposed to take an active part in social reforms, and this is just what Mr. Gilman has given us. He has, himself, naturally enough, a high opinion of the value of participation in profits as a remedy for the antagonism between master and man which has brought so many misfortunes to the community, but he does not allow his prepossessions to color his presentation of the facts, and he deserves our gratitude for his scrupulous fairness.

It is curious that a large proportion of the successful profit-sharing enterprises date from 1847–48, the era of the fever for liberty which attacked the people of so many European countries, and ended in a dozen unsuccessful revolutions. The most famous of all, the Maison Leclaire, entered upon the practice of its system in 1842; but Leclaire lived in Paris, the hot-bed of socialistic ideas, and was an enthusiastic student of social and economic questions, so that it is natural enough that he should have begun to put in practice the ideas that he had gathered a few years before the propaganda which had affected him began to make its way into the outside world.

It is curious to learn that a theorist was, against his will, the author of the solution of the problem which perplexed Leclaire. From an ambitious and industrious apprentice he had become a successful master house-painter and decorator, and, being warmly attached to his workmen, he was anxious to devise some way of securing their future, without subjecting them to the degradation of accepting charity. Like a practical philanthropist, however, while searching for the ideal system, he practised an imperfect one, which consisted in encouraging his men to form permanent connections, in lending them money without interest, in promoting the establishment of a mutual-aid society, supported by subscriptions, and in maintaining a strict discipline in a trade which had the reputation of comprising the worst and most reckless of all Parisian workmen. About 1835, Frégier, then chief of a Government bureau, and fresh from the agitations which ended in the coronation of Louis Philippe, conceived the idea of writing a book on the "*Dangerous Classes*," who had made themselves so unpleasantly conspicuous a few years before, and went to Leclaire as a man who could probably furnish him with information on the subject. He found in him a social theorist like himself, and the two had many discussions on the questions which interested them both. In the course of these Frégier propounded the doctrine that there was nothing, so far as he could see, which would do away with the antagonism between employer and employed, of which Leclaire complained, except the participation of the workman in the master's profits. Leclaire, as he says, "emphatically rejected" this idea, which was quite inconsistent with the economic theories contained in his books, and, moreover, seemed to him entirely impracticable. Nevertheless, the novelty of the notion attracted him, and, as he says, it took root in his mind. Five years later, after Frégier's book was finished and printed, Leclaire was overwhelmed with orders, and, in thinking how he could contrive to fulfil them all, he "perceived all at once a way" in which he could apply Frégier's profit-sharing idea, and at the same time serve his own interests and those of his best workmen. Frégier himself, on hearing of the scheme, discouraged it, urging all sorts of objections, but Leclaire was determined to try it, and in June, 1840, he assembled his best workmen, to the number of eighty or ninety, and explained to them his plan, by which he proposed to divide the profits of his business with them. As those acquainted with workmen can understand, the proposition was received very coldly, and it was not until two years later, after a long series of formal and informal discussions with the men, that the plan was actually put in operation. In February, 1842, a circular of rules and terms was issued, by which, in February, 1843, a division was to be made among the members of the *noyau*, or nucleus, consisting of forty-four of the men who had been longest in his employ, of a certain part of the profits of the year's operations. The men submitted, rather than acceded. Many of them thought that some trick was being played on them, and one of the workingmen's newspapers openly denounced Leclaire as having contrived a scheme to lower wages; but the majority of the members of the *noyau* thought that he probably meant well, and consented to trust his good faith until the end of the year, but without counting much on their dividend.

The twelve months went by, not very prosperously, but sufficiently so to provide something for the workmen, and Leclaire, who had the lively genius of a true Frenchman prepared a little sensation for the men. On the 12th of February, 1843, he called together the men composing the *noyau*, and, standing before them, threw down upon a table a bag containing nearly twenty-five hundred dollars in coin. Then, opening the bag, he distributed the money among the men. Probably few of them had ever had fifty-six dollars at once in their hands before, and, as might be imagined, from that time the success of the scheme was assured.

Leclaire was of altogether too active a temper to be satisfied with the system he had established. After a year or two, finding that the encouragement which it offered to the men had made them reliable enough to be left a little to themselves, he began some chemical researches on his own account, to try to discover some substitute for white lead, whose poisonous effects on his workmen he knew only too well. With the help of Chevreuil he decided that oxide of zinc presented the most advantages, and after securing some zinc mines, he established a factory for the preparation of this substance which has ever since been exclusively used by him and his successors.

Returning, after this benevolent undertaking had been fairly started, to his profit-sharing plans, he took up the problem of making the yearly dividend more useful to the men by inducing them to lay it by as a provision for old age instead of spending it. He found his men quite averse to exchanging any part of their cash dividend for the prospect of a retiring pension, so, without wasting time in discussion he coolly informed them that unless they agreed to what he thought best, he would add to the *noyau*, as he had a right to do, so many new members that the dividend of each would be very small. The men could not well resist this argument, and concluded to accede to his plan, by which thirty per cent only of the year's profits was divided among the workmen in cash, and twenty per cent was reserved as an addition to the fund of the Mutual Aid Society, from which pensions are paid to superannuated members and to the families of those who die.

Until 1871, participations in the profits of the house were confined to the *noyau*, but in that year Leclaire pushed his idea to its complete expression, by procuring the passage of a resolution by the *noyau*, admitting to the benefits of participation all the employés, even to the apprentices and the temporary journeymen, so that now every man who does a day's work with the Maison Leclaire shares proportionately in the year's profits.

On the 19th of July, 1872, this great man died in his cottage at Herblay, leaving behind him a strong, experienced and well organized association, which he had accustomed to doing without him by withdrawing formally some years before from the firm, and which has gone on ever since in a course of quiet prosperity. Although he transmitted to his heirs only the comparatively modest fortune of a quarter of a million of dollars, he often said that "he could not have accumulated so much even by fraudulent means without the participation of his men in his profits."

Something of the same feeling seems to be common among the masters who have successfully admitted their employés to a share in their profits. In nearly all cases when they speak of the matter, they declare that it has been with them a purely business matter, that it has been profitable to them as well as to their men, and that they are not entitled to any credit as philanthropists. However that may be, there is no question that participation promotes good feeling and consideration on both sides. Even the public usually has occasion to remark gratefully the politeness and attention

[1] "*Profit-Sharing between Employer and Employé*," by Nicholas Paton Gilman. Boston: Houghton, Mifflin & Co. 1889.

with which it is treated in the profit-sharing establishments, and Mr. Gilman's book gives many instances of mutual good feeling between masters and men, which form a pleasant contrast to the usual morals and manners of "business." In fact one of the most interesting things shown in the book to those who believe, as we do, that the prudent and honest use of one's own and other people's property ought to form a part of every child's education, is the effect of profit-sharing in teaching workmen to be careful about small things. In one establishment described, the men are so business-like that no one will even hand over to another an unfinished piece of work without getting a receipt for it, and there are many similar instances of a minute care for details in such establishments which would do credit to the more skilful and experienced manager.

BUILDING LAW.

WHAT IS MEANT BY WORK SATISFACTORY TO THE OWNER?

AGREEMENTS that work or materials to be furnished by one party to a contract shall be "satisfactory" to the other, the purchaser, are of quite common occurrence, particularly in building contracts. The exact meaning, however, of the word "satisfactory" may differ in different cases, and is not always easy to determine. Sometimes it is held to mean "reasonably satisfactory"; that is to say if the work was, in fact, properly done, the owner could not avoid payment by returning it and saying that he was dissatisfied with it.

Sometimes, on the other hand, the word is to be taken in its literal meaning; and, if the owner is dissatisfied with the article and returns it to the manufacturer or contractor, the latter can recover nothing. In such cases, however, if the work cannot be returned, as when permanently affixed to the defendant's premises, the plaintiff would generally be entitled to maintain an action for the fair value of the article deducting what it would cost the owner to make it satisfactory.

If the architect or owner, or whoever draws the contract, intends to reserve the right to reject the material if personally unsatisfactory to the owner, this intent should be made clear by appropriate and unmistakable language. If the matter is left in doubt, taking the instrument as a whole, the courts will be inclined to construe the contract as meaning to the "reasonable" satisfaction of the owner.

These remarks are induced by the recent decision of the Massachusetts Supreme Court in Hawkins *vs.* Graham, a case where steam-fitters sought to recover a bill for a heating apparatus. Our readers will probably recollect that earlier in the year reference was made in the editorial columns of this paper to a somewhat similar case arising in France, and may be interested to note the extreme diversity of the reasoning adopted by the courts in the two cases. The facts also were different; in the French case the apparatus did not work, and in the Massachusetts case it *did* work properly, though not "to the satisfaction of the owner."

In the Massachusetts case the Court lays down the common law as follows:

"The only question in this case is whether the written agreement between the parties left the right of the plaintiff to recover the price of the work and materials furnished by him dependent upon the actual satisfaction of the defendant. Such agreements usually are construed not as making the defendant's declaration of dissatisfaction conclusive, in which case it would be difficult to say that they amounted to contracts (Hunt *vs.* Livermore, 5 Pick. 395, 397), but as requiring an honest expression. In view of modern modes of business, it is not surprising that in some cases eager sellers or selling agents should be found taking that degree of risk with unwilling purchasers, especially where taste is involved. . . .

"Still, when the consideration is of such a nature that its value will be lost to the plaintiff, either wholly or in great part, unless paid for, a just hesitation must be felt, and clear language required before deciding that payment is left to the will, or even to the idiosyncracies of the interested party. In doubtful cases the courts have been inclined to construe agreements of this class as agreements to do the thing in such a way as reasonably ought to satisfy the defendant."

In the contract in question it was provided that the apparatus should be satisfactory to the owner, and there was also this clause:

"In the event of the system proving satisfactory and conforming with all the requirements as above provided for, the sum of $1,575, as above provided for, to be paid by me, after such acknowledgment has been made by the owner *or the work demonstrated*."

The Court held that the words "or the work demonstrated" qualified the word "satisfactory," so that the contract, taken as a whole, bound the defendant to pay for the apparatus, if it, in fact, worked properly.

Oftentimes in building contracts it is important for the owner to retain an absolute right of rejection, and, generally, no injustice is thereby done the contractor. For instance, it is generally provided that either the owner or architect may reject, absolutely, certain of the materials used in the building (as piles, foundation stone, etc.), which are "unsatisfactory," this being found to be practically the easiest way of compelling the contractor to furnish proper material. Here no injustice is done, for of course the material rejected can be taken away by the contractor, he has only the expense of carting; and there is no inducement for the owner to be unreasonable in his approval of the material, as such a course would only tend to delay the work.

The above case, however, shows that it is important that the right of rejection should be expressed in unqualified terms.

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

AN OWNER'S RIGHT TO GIVE ORDERS.

BALTIMORE, MD., June 18, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Please give me an opinion, in the columns of your paper, on the following case:

A being the building-committee and B the architect. A employs B to prepare designs and superintend the erection of a large school-building. The contract containing the usual clause as to ownership of drawings was signed by all parties. After the work had been in progress for some time and all the detail drawings had been finished, A begins to ignore B, and gives orders to contractors directly contrary to those given by B. B remonstrates with A, and points out the evils that may arise from such a course. A, however, pays no attention to B but continues to interfere, giving the contractor orders which will ruin the design of the structure, even if it does not jeopardize the safety of the building. B has sent a notice to contractor to return all drawings and refuses to give them to A, unless A agrees to allow him to finish work his way. Has B any right to pursue such a course, and can he demand a commission for any part of his work? Yours truly, C. E. GARDINER.

[B is wrong. He is engaged to do certain work, and is to receive pay for doing it. If he refuses to complete what he engaged to do, he cannot claim any of the promised compensation, unless he has an agreement of some kind entitling him to withdraw at pleasure and to be paid for partial service. As to interference with his directions, he seems to forget that the building belongs to A, who has a perfect right to construct it in any way that he chooses. It is not likely that the contract requires that the building shall be erected as B wants it, and not as A wants it, and in default of some such contract, B gives directions only on sufferance from the owner, who can supersede and contradict them at his own sweet will. All that B can do is to make sure that the catastrophies which may follow A's directions are not visited on his head, by giving timely and liberal warnings as to the probable consequences of them. In a French court he might stand some chance of being consoled for his experiences by having damages awarded him for injury to his professional reputation through the mangling of his design, but an American jury would find it hard to comprehend anything like artistic property.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

PROPOSED SUBMARINE BRIDGE UNDER THE SOUND.—Under the paradoxical name of a submarine bridge, a design has been put forward by a Swedish engineer, Mr. Rudolf Liljequist, A. M. I. C. E., for making a permanent railway communication between Sweden and Copenhagen. Although only 2½ miles apart, traffic is frequently interrupted during the winter months by ice, and the trade between the two countries greatly inconvenienced. The proposed structure, which would join Elsinore to Helsingborg, is a bridge composed of 100 feet spans, and carrying a single line of railway. It is to be submerged to such a depth as to allow ample seaway for all classes of ships to pass over it. To protect the trains against the water the entire bridge is to be surrounded and encased by a tube, composed of an outer skin of iron and an inner skin of steel, with the intervening space filled with concrete. The weight of the tube would be such that it would nearly float, and thus would not be subject to any transverse strains. It is foreseen that the outer skin might possibly rust away in course of years, but it is believed that the concrete would remain intact and perfectly protect the steel. The piers would consist of ordinary caissons filled with concrete and placed about 100 feet apart. The tubes would rest on these piers and the girders would take a bearing on blocks inside the tube immediately over the piers. The tube would be built in 100-foot lengths, floated out and lowered into place. The piers would be built in concrete by aid of caissons, and their surface would be formed to receive the tubes, which would be firmly secured to them. As an additional safeguard a massive collar of concrete would be moulded over the joint. The concrete shell would be in lengths to allow for expansion, while the metal shells would be continuous. It is proposed to use in the erection pontoons of the kind which have been successfully employed in building the Tay Bridge. These are rectangular in form, and have a leg at each corner worked by an hydraulic ram. Such a pontoon is floated into place and then the legs are thrust out until the whole becomes perfectly stable. On these pontoons would be placed all the necessary appliances for founding the piers and lowering the tubes into position. The estimate places the cost between 600,000*l.* and 700,000*l.* for the submerged portion, without the approach

tunnels. The advantages claimed for this scheme over a submarine tunnel are the safety and rapidity of construction, and the avoidance of unforeseen difficulties. — *Engineering.*

Fans or Hot-Water. — The entire absence of sanitary arrangements in Chinese towns and villages being well-known, it goes without saying that the laws of hygiene are utterly and entirely neglected. There is no isolation of infectious diseases, and no attention is paid to causes of death unless there is supposition of violence. According to our ideas, therefore, Chinese cities ought to be hotbeds of disease, subjected regularly to those terrible epidemics which, with us, are invariably associated with the neglect of sanitary laws. Strange to say, such is not the case. Epidemics come and go without any apparent reason, appearing, perhaps, suddenly, causing a heavy mortality for a short time, and then as suddenly disappearing again, thus affording an endless field of speculation to the foreign savant. But, speaking generally, Chinese towns enjoy an immunity from these dangerous outbreaks almost as complete as that of well-drained European communities, and the cause of this puzzling and curious phenomenon has been variously explained. The fact is all the more striking when taken in connection with the contaminated water-supplies of Chinese towns, the effect of which on Europeans has been manifested over and over again in the heavy mortality which overtook them previous to the adoption of precautions enjoined by modern sanitary science. The healthiness of Chinese cities has been ingeniously attributed by some people to the universal habit of fanning, a practice which is said to keep the atmosphere in constant circulation. How far this explanation can be deemed to suffice we must leave to experts to decide, but, so far as a contaminated water-supply is concerned, we believe the real secret of immunity from its evil effects to lie in the universal custom of boiling all water intended for drinking. As a matter-of-fact, the Chinese never drink cold water. The national beverage, which, in a true sense, may be said to cheer but not inebriate, is tea, and this is always "on tap," even in the houses of the very poor. The native aversion to cold water is undoubtedly carried to extremes, and certainly induces diseases which might easily be avoided by a judicious system of outward application. In the matter of ablutions it must, however, be admitted, that the Chinese enjoy facilities which, however little they are taken advantage of, are far in advance of anything within the reach of the poorer classes of our own favored land. Every little hamlet in China has a shop where hot water can be bought for a trifling sum at any hour of the day or night. Even in a small fishing village on a remote island in the Gulf of Pechili, where the writer spent six weeks under very unpleasant circumstances during a severe winter, this was the case, and a great convenience it proved. — *The National Review.*

An Electric Indicator for Lightning-rods. — A new instrument for recording when a lightning-conductor has acted is being brought out by Messrs. Hoyer and Glahn, of Schöneberk. Briefly described, this instrument consists of a galvanometer with a long magnetized needle pivoted on a horizontal axis, and kept horizontal by a small weight. Below the needle is a soft iron core surrounded by a solenoid, which is coupled as a shunt between two points of the lightning conductor; and if this core becomes excited, one or the other end of the magnet is attracted, and remains attached by virtue of its own permanent magnetism. The inventors thus hope that the instrument will indicate not only through which conductor a lightning discharge has passed, but also the direction of the discharge, whether up or down. Instruments would be fixed on the various lightning-conductors, and by mere inspection of them after each thunderstorm it would be easy to see which of the conductors are most likely to be chosen by the lightning, and should therefore receive the most attention to keep in good order. — *Inventor.*

Historic Inundations. — No flood so disastrous as that in the Conemaugh region has ever before been known in the history of this country. In the Mill River disaster near Northampton, Mass., in 1874, in which a number of villages were destroyed through the bursting of an ill-constructed reservoir, only 144 were lost, and in the same year, when the rivers of Western Pennsylvania overflowed their banks as the result of an unusual downfall of rain, the number of persons who were drowned was but 220. In the year 1758 more than 400 families were drowned in an inundation at Glasgow; at Dort, in Holland, in 1421, the sea broke in and drowned 100,000 people, and in the most memorable of all inundations — that which in 1530 was caused in Holland by a general failure of the dykes — the loss of life was reckoned at 400,000. In Catalonia, in 1617, 50,000 persons perished by flood; in Silesia, in 1813, 6,000. The loss of life during the recent floods in Austria-Hungary and in China has never been fully reckoned up, and though 100,000 persons are said to have been drowned in the Chinese inundations, the figures are not trustworthy. — *New York Commercial Advertiser.*

To Protect Wood against Fire. — An investigation has been made by Professors Bordin and Dunny, of the Ghent University, at the requisition of the Belgian Minister of Public Works, in regard to rendering wood uninflammable. They reported that to deprive wood to a considerable extent of the property of exciting and communicating fire it is sufficient to coat it with a suitable composition. A practical process must not be too expensive nor take too much time, and the substance used must not attack any metal used in connection with the wood. Two methods of treatment may be mentioned. One is the injection of saline solutions, which appears but little applicable except to small pieces of wood, and may be dangerous in the case of wood of large dimensions. A concentrated solution of phosphate of ammonia, although expensive, is undoubtedly the best substance to apply by injection. Certain substances, notably chloride of calcium, should be rigorously excluded, because they would keep the wood constantly damp. This method may be applied to small articles by immersion, and the solution should be hot. In the majority of cases, including existing structures, applying some coating with a brush is the only practicable treatment. The wood thus coated should present a neat appearance, and should be capable of receiving a coat of ordinary paint, nor should either coating deteriorate within a moderate time. The best substances for such application are cyanide of potassium and asbestos paint. — *Fire and Water.*

Malleable Bronze. — A patent has been taken out both in England and France, by Mr. A. Sentex, Mr. C. Marechal and Mr. A. Sannier, establishing a process for producing malleable and ductile bronze bars or plates which are free from cracks and blowholes, are "inoxidizable," and which may be "rolled and drawn with the greatest ease." Moreover, the metal has the appearance and "sonorosity of gold." One and-a-half kilos. of tin are purified by melting under nitre. Ten kilos. of copper are melted and 50 grammes of equal parts of nitrate and cyanide of potassium are added for the double purpose of reducing the oxides and "fattening" the metal. Then 25 grammes of bitartrate of potassium, with the same quantity of cyanide, are added, and, after poling, the tin is introduced; 25 grammes each of sal-ammoniac and cyanide are thrown on, 1 gramme of "phosphuret of copper" introduced to "impart mildness," and 20 grammes of "Marseilles soap" added, which still further "fattens" the metal. Finally, 1 gramme of sodium is added at the moment of casting. The metal, if cast in sand, may contain more tin, and if the proportion of tin be reduced, the quantity of phosphorus and sodium may be increased. — *Iron World.*

TRADE SURVEY

There exists a deep anxiety in business, railroad and financial circles over the possibility of a reaction from the present healthful conditions. The exportation of nearly ten million dollars in gold within two weeks, and of some twenty-eight millions since April, the decline in the surplus reserves within a year from nearly twenty-six millions to some nine millions at this time, the urgent demands for funds in the West, the narrowing margins in all lines of business, the general upward tendency in prices — these and other facts and influences are taken by many to indicate that a turn may be taken that will be to the disadvantage of those who have large engagements at fixed prices. On the other hand, one hundred railroad companies show an increase in gross and net earnings over last year, but this comparison is made with roads which lost twenty-three million dollars last year. The stocks of anthracite coal are increasing, and are now almost one million tons. The soft coal trade is about as active as usual, but the mining capacity east of the Mississippi is away ahead of demand. Lumber operations are conducted on a large scale, and last week some of the largest contracts of the season were placed, not only among railroad companies, but in the trade at large. Car-builders are in the market to-day for oak and yellow pine. Walnut exporters are doing well. Poplar holds its own everywhere. Trade combinations in lumber, except in Georgia, are maintaining their grip. The policy of wholesalers and retailers is to buy as the trade calls, and to avoid accumulations. It is this that accounts for the generally strong prices. In iron and steel no striking transformation is apparent. Steel-rail mills are filling up, and prices are now, for the first time this year, strong at $28 in the East on all except exceptionally large orders. Bridge-iron makers are also better off than for months, and in this statement plate-iron makers may be included. Nail-makers have been getting rid of large accumulations. Crude-iron makers are doing what they can to push prices on fall deliveries upwards. There is no room for speculative movements in petroleum. Wool is quiet, but strong. Textile manufacturers are making excellent progress, carefully avoiding such a production as would threaten to jeopardize prices through enforced auction sales. Imports are heavy, but the consumptive requirements are extraordinary. It is proper here to remark again that the trust-forming tendencies are stronger than ever; that new combinations are being made and projected; that capital is more confidently seeking opportunities therein. The smaller interests are obliged to combine in a great many instances. Legislative control has not retarded or controlled these combinations, and they have apparently entered upon an era of greater activity and scope. In many respects their formation is but the natural outcome, and is in conformity to the general law of progress. In some other respects damage is being done and greater damage threatened. Eventually there will, no doubt, be a sort of popular granger-like agitation and protestation against the entire system.

The architects are closing a very successful half-year. Their statements for the coming half-year, so far as made, point to even greater activity. House-building, especially of small houses, has been very profitable, particularly in the newer and smaller manufacturing centres throughout the interior. The distribution of lumber of the past thirty days shows the extent of building activity. Building labor is in demand. Wages are good, and there are no strikes worth noting. The larger cities west of the Mississippi are keeping up their last year's record. Chicago lumber dealers have contracts for about all the stuff they can get out. The builders of houses, factories, bridges and of large manufacturing establishments in the sections now the theatre of the general industrial revival, have about all they can hurry through before cold weather. What has been said of the activity in the Southern States can only be repeated so far as opportunities for investment are concerned, there are as many as ever, and the inflow of capital continues. Leading financial authorities remark that there never was a period when so much investing was going on in purely industrial and commercial channels. Of course the whole business world is on tip-toe for a general advance in values that will make plants and investments more productive, but the reasons for such anticipation are difficult to assign. The ship-builders were never busier, and in a few months one of the finest, if not the finest yard on the American continent will be open for work at Newport News. The Bethlehem Gun Works are being hastened forward, and much heavy machinery is being put in to turn out exceptionally large work. There is nothing to warrant fears of a reaction in trade. A larger percentage of business is being year by year done on practically a cash basis. The West is yearly becoming more and more financially and commercially independent of the East, and, therefore, self-supporting. A panic or depression in one locality is not as likely to extend to others as a few years ago. National legislation is becoming less political and more of a business character, and business interests and requirements are more clearly studied, and the wishes of business men more respected.

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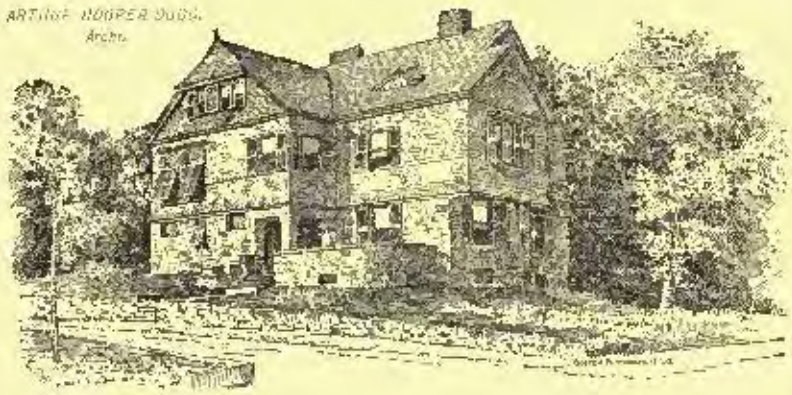

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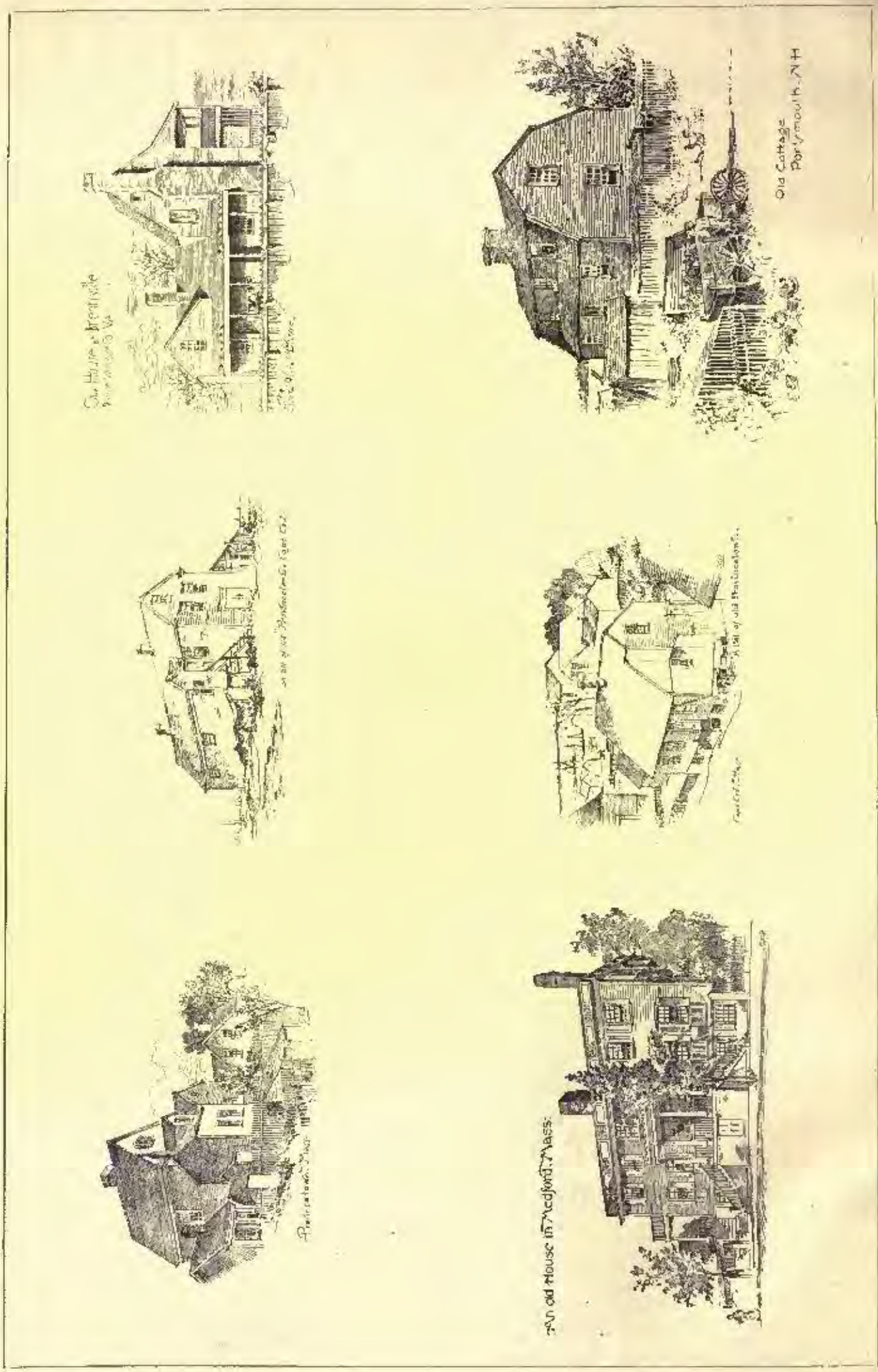


OLD AMERICAN HOUSES.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 84. SATURDAY, JUNE 1, 1889. VOLUME XXV. No. 701.

THE "PERFECTION" STEAM-RADIATOR.

RECOGNIZING the demand, which is apparently universal, for a direct Radiator for Steam and Hot-water Heating, which shall be more perfect as regards construction and design than anything hitherto manufactured, we desire to call attention to the "Perfection" Radiator.

After thoroughly investigating all the radiators now in the market, and obtaining reports from experts and consumers in all sections of the country, we have endeavored to produce an article that is superior to all its predecessors, both in appearance and construction.

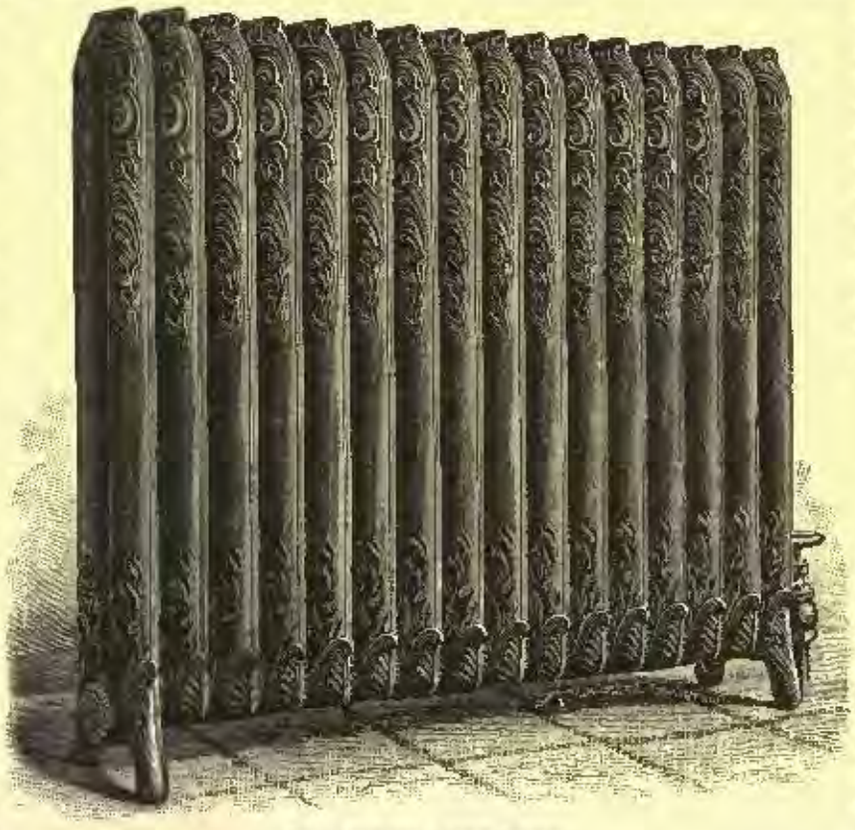
Our new radiators are manufactured in plain or ornamental style, as preferred, and we have aimed to produce a design upon the ornamental loop which is appropriate and in perfect accordance with the most advanced ideas of artistic decoration of iron surfaces, at the same time avoiding all appearance of clumsiness and harshness of outline.

In entirely dispensing with all forms of removable tops, we think we have made a long stride in the line of improvement. A removable top seems to us to be quite unnecessary, and, if put upon a radiator which has no projecting base, it is architecturally incorrect, and gives the radiator a top-heavy appearance. It is very liable to be broken, and obstructs the free circulation of air through the radiator. It also collects dust and dirt and causes the currents of warm air to impinge against the walls, producing unsightly discolorations. It makes the radiator appear too prominent and bulky as compared with its surroundings. It does not increase the efficiency of the radiator, and we cannot see wherein it is of any possible good except to hide the clumsy joints of poorly constructed radiators; hence our reason for discarding this form.

Our design for the upper portion of the radiator embraces all that is required. It has a graceful finish. It has a flat top. It will not break. It will not accumulate dirt. The decoration of the upper and lower portions of the radiator are in perfect harmony, as may be observed by examining the cut.

The result of our efforts is that we have produced a radiator which is architecturally correct and in perfect taste artistically.

Our improved construction secures free, unobstructed and large openings for the passage of steam and water. The loops have the full areas of heating-surface which we claim for them, and our castings are as perfect as the finest irons and the best workmen can make them.



The "Perfection" Steam Radiator.

The loops of our hot-water radiators are screwed together top and bottom with right and left nipples made of steel, and by this process the loops are drawn tightly together and held firmly in place, the face of each loop at point of contact being milled perfectly smooth and true. No packed joints are used, nor joints of any kind which require bolts or rods to hold the loops together. The screwed nipple we use makes a permanent joint, and the longer it is in place the tighter it becomes. The loops of our steam-radiators are connected at the bottom only with the same style of nipple as above described for hot-water radiators.

The supply and return openings are adaptable to any of the different systems of piping now in use. We have erected an entirely new plant for the exclusive manufacture of radiators, equipped it with the most perfect special machinery obtainable, and have at present a capacity for producing 10,000 feet of radiation daily. Any letters of inquiry or other communications with which we may be favored will receive our prompt and careful attention, and we shall be pleased to quote terms for large or small quantities.

MICHIGAN RADIATOR & IRON MANUFACTURING CO.,
DETROIT, MICH.

A POPULAR WINDOW-BLIND.

THE Hartman Patent Sliding Window-Blind, advertised on another page of this issue, is rapidly growing into public favor, and has already gained a widespread reputation such as no other blind of the kind has attained.

One of the important features connected with it is its *Burglar-Proof Lock*, which comes attached with each set of blinds *free of charge*. This is an advantage that no other blind in the market has; and in these days of house-burglary and robbing, it is an item of no small consideration, and may save the owner and home many times the cost of the blind, and, perhaps, life also. Reader, if you are building, you cannot afford to use any other blinds. They have many other advantages over all other blinds, which, for want of space, we cannot enumerate. The highest recommendation they can have is the unprecedented and constantly increasing demand for them by architects, builders and the

public, so that each yearly output for the past few years, doubles that of the former year, and judging from present prospects, the fourth year since their invention, will double again the output of last year.

The cut represents the "Novelty Style" of the blinds, which is a modification which has certain conveniences that are often preferred to the common styles. In this the blind-sections are made in the usual manner. But the inside divisions of the lower section is made to swing on hinges, so as to open and shut at pleasure, while, at the same time, the section slides up and down in connection with the other sections.

Five patents have already been issued, while three more applications for important improvements are now pending in the United States Patent Office.

The manufacturers are receiving hundreds of *voluntary* and *unsolicited* recommendations from parties having them in use.

Dr. D. H. Howell, M. D., of Atlanta, Ga., writes to a friend as follows, dated May 7, 1889: "Having used the Hartman inside sliding-blinds in my new residence, I consider them the best blind of the kind on the market."

Such expressions of commendation as the following are quite frequent:

"I thank you for sending me the best blind I ever saw."

"We continue to like them."

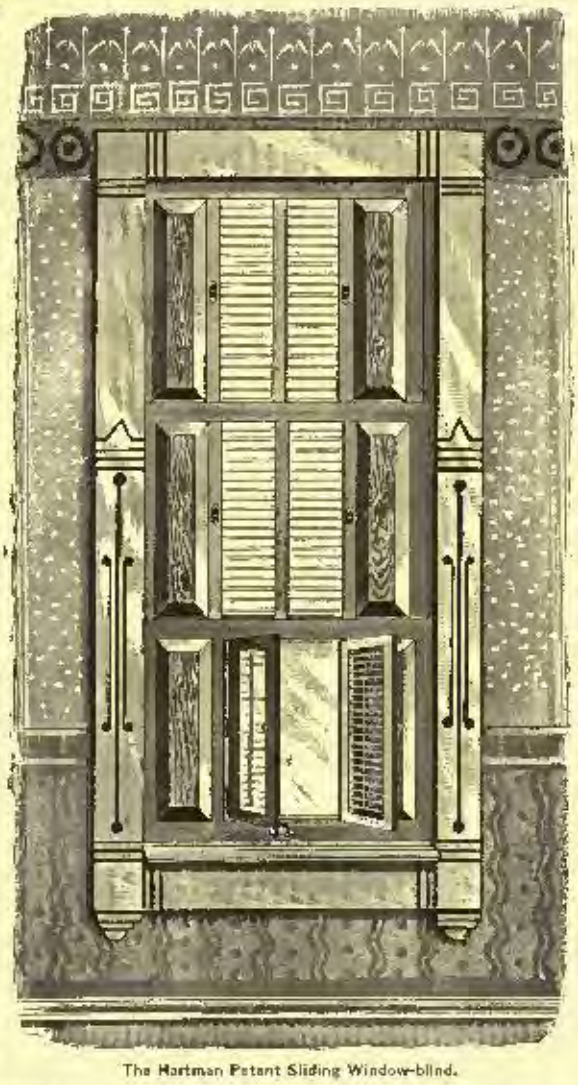
"The ladies especially are pleased with them."

"I would have no other blinds."

"They are *par excellence*. I bespeak for them an immense trade," etc., etc.

If you are building, remember it has no equal, a burglar-proof lock goes with each set of blinds free of charge. Send for illustrated catalogue and prices. Agents wanted everywhere. States rights for sale. Address

HARTMAN & BURSTINE,
WOOSTER, O.



The Hartman Patent Sliding Window-blind.

WESTINGHOUSE MACHINE CO.

AMERICAN MACHINERY IN SPAIN.

The great "Tarzuela" at Madrid, Spain, which is the largest theatre in the kingdom, has recently introduced a complete installation of electric-lighting, under the supervision of Mr. L. Delannoy, mechanical engineer, of Barcelona; a 12 and 20 x 12 Westinghouse Automatic Compound Engine, built at Pittsburgh, being used as the motor.

HAVANA INTRODUCES THE MECHANICAL GLOW-WORM.

The Spanish-American Light and Power Company of Havana, Cuba, have completed their new plant, which is now in very successful operation. The power consists of one 13 and 22 x 18 (125 horse-power) and one 10 and 18 x 10 (65 horse-power) Westinghouse Automatic Compound Engines.

INCREASING ITS CAPACITY.

The Westinghouse Machine Company of Pittsburgh, Pa., is fitting up a new machine-shop, for large work, on the east side of Twenty-fifth Street and Liberty Avenue. A very large new planer, by William Sellers & Co., is already erected and in operation, and a large new cylinder boring-machine, of special design, by the Pond Machine Tool Company, is now in process of construction, with the delivery promised for June 1. Other large tools will be added. The new shop is rendered necessary by the company's heavy run of orders for large compound engines.

A PROSPEROUS MONTH.

Although the month of May, 1889, will not go down into history as an unusually prosperous one, from a business standpoint, the Westinghouse Machine Company report orders received for the first twenty-one days of the month as follows: Westinghouse Automatic Compound Engines, 17 (1,885 horse-power); Westinghouse Standard Automatic Engines, 19 (745 horse-power); Junior Automatic Engines, 30 (745 horse-power); 21 days' totals, 66 (3,375 horse-power).

If the remaining ten days of the month show the same ratio, this will prove to be a very prosperous month in the company's history.

ORDERS FOR COMPOUND ENGINES.

Among the orders for their new automatic compound engines received by the Westinghouse Machine Company for the first three weeks in May, the following prominent buyers may be mentioned: Baldwin Locomotive Works, Philadelphia, Pa., one 200 horse-power; Southern Cotton Oil Company, Memphis, Tenn., one 250 horse-power and one 200 horse-power; Omaha & Council Bluffs Railway and Bridge Company, Omaha, Neb., three 200 horse-power; L. Delannoy, Barcelona, Spain (for Clariana, Ciuro, Pubconat & Co.), one 35 horse-power; Electric Improvement Company, San Francisco, Cal., one 30 horse-power and one 35 horse-power; Pennsylvania Institute for Feeble-Minded Children, Elwyn, Pa., one 50 horse-power and one 35 horse-power.

SUCCESS IN MANUFACTURING.

The question has often been asked: Why does one man succeed in business and another man fail? If one has a due regard for history, it would perhaps be nearer the truth to ask: Why do three men succeed in business and ninety-seven fail? In so far as the manufacturing business is concerned, the agents of the Westinghouse Machine Company have recently been making some investigations that at least afford a clew to the answer. In order to obtain statistics for use in their catalogues, this company sent experts, fully equipped with the necessary instruments, to visit a number of the most prominent manufacturing establishments in the country, where permission was asked to test the consumption of power by each machine. As a rule, this was readily obtained from the owners, they seeming much interested in the results. It is only necessary to indicate a few of the results obtained to make clear the point aimed at. Nearly all were wasting one-half (½) of their engine's power (or one-half of the daily consumption of fuel) before commencing actual work, the product from which constituted the maintenance of the business. One prominent establishment was wasting sixty-five (65) per cent of its fuel and power; another was wasting seventy-three (73) per cent, thus leaving only twenty-seven (27) per cent of the engine's power to earn money with. Another celebrated firm (known all over the West) was using a 60 horse-power engine, of which 55 horse-power was being consumed in dead work, thus leaving 5 horse-power with which to produce goods for sale without overtaxing the engine. It is an "up-hill" business to make money in manufacturing under such circumstances. Sensible people should be more economical. What is the use of economizing in wages and in the cost of raw materials when such reckless waste as above indicated is permitted in many of our most prominent establishments? Few people in this country seem to realize the amount of money that can be wasted in a year through the steam-pipe. The proverbial "rat-hole" will not compare with it. The manufacturer who has learned to economize at the steam-pipe has learned one of the most important secrets of success.

WESTINGHOUSE MACHINE CO.,
PITTSBURGH, PA.

DIXON'S SILICA-GRAPHITE PAINT.

A PAINT to give satisfaction should be a protection against heat, cold, the changes of temperature, the wear and tear of storms, and rust. It should be durable, easily laid on, cover well, and economical.

Graphite and Silica stand equally well extreme cold and the changes of temperature; they cannot be touched by rust, and both are a sure protection against the influence of a salt atmosphere.

Graphite is very light. One pound of Graphite is three times the bulk of one pound of white lead, and twice the bulk of mineral paints; hence in use we guarantee Dixon's Graphite Paint to cover fully twice the surface of white lead or mineral paints.

The natural color is a slate, but we can furnish it in all shades from a slate to a jet black, suitable for regular surface painting or trimmings for houses, out-buildings, metal or shingle roofs, bridges, locomotive work,

agricultural implements, and, in short, all exposed wood or metal surfaces needing a durable and economical paint.

Graphite is one of the forms of carbon. It is healthful in itself and, as it is unaffected by contact with any known substance, it suffers no chemical change and remains always the same. All the ingredients of Dixon's Graphite Paint are harmless. Painters will suffer no cramp or colic in using it, and cistern-water gathered from roofs painted with this paint will be perfectly pure.

A tin or metal roof painted two good coats, with a third coat put on the following year, will not need repainting for fifteen years unless worn by walking on or otherwise abused.

There appears to be no limit to the time that a tin roof will last if it is protected from atmospheric action by means of paint, and is not worn or injured by walking on or other causes. Testimonials we have received show that tin roofs painted with Dixon's Graphite Paint have not only lasted fifteen years without repainting, but required originally only from one to two-thirds as much paint.

Iron has a tendency to oxidize from the moment it leaves the hammer or rolls, and should be painted to protect it from the rust which attacks the metal and soon destroys it.

Bituminous paints, as well as those containing variable quantities of lead, were formerly considered the best, but their failure has been made apparent when the structures to which they were applied have been of sufficient size to be subject to the many changes of the weather as well as constant vibration. Dixon's Graphite Paint has been found, by careful and practical tests, to be peculiarly suited for iron work.

In 1884 the Trenton City Bridge Company painted their bridge (1275 feet long) across the Delaware River with Dixon's Graphite Paint, and inspection now (1888) shows that after four years' wear the paint is as good as the day it was put on.

For metal roofs, bridges, locomotive work, agricultural implements, and, in short, all exposed metal surfaces needing a durable and economical paint, nothing can be found that will begin to equal Dixon's Graphite Paint.

For house-trimmings, out-buildings, shingle roofs, boats, wooden bridges, agricultural implements, fences, etc., Dixon's Graphite Paint is the best that can be used, for less paint is required, and it is almost everlasting.

It is prepared thick, ground in oil, about the consistency of a stiff paste, in 10, 25, 50, and 100 pound packages, and in barrels of about 450 pounds, or thinned, ready mixed for the brush, in 5, 10, and 25 gallon packages, and in barrels of from 40 to 50 gallons.

JOSEPH DIXON CRUCIBLE COMPANY,
JERSEY CITY, N. J.

A LARGE number of Catholic schools on Staten Island, N. Y., have been plastered with King's Windsor Cement, and we are informed more will soon be plastered with the same material.

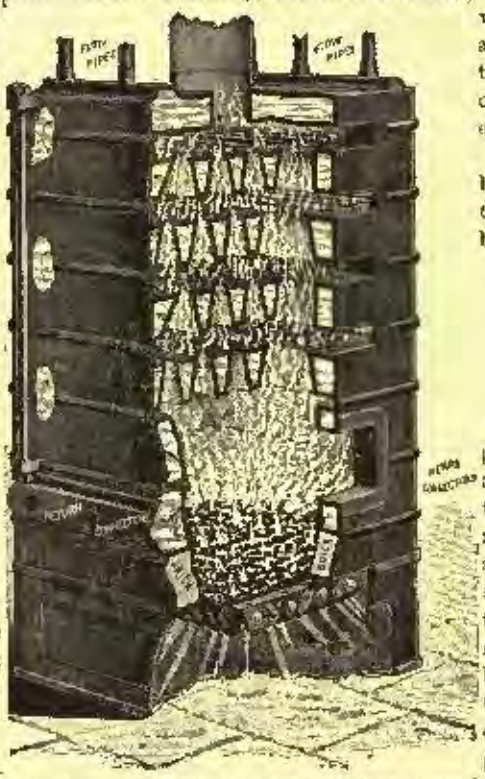
The office of J. B. King & Co., the manufacturers, is at 24 State Street, New York. The plastering department is in charge of Mr. Lovell H. Carr.

"PERFECT" HOT-WATER HEATERS.

WE show herewith an illustration of the "Perfect" Hot-Water Boilers. These boilers are becoming very popular throughout the country, from the fact that they have the enormous heating capacity which experience has found to be absolutely necessary. They are made with special reference to heating water quickly and economically; and at the same time, are so constructed as to create a quick, positive circulation, which is an absolute necessity in heating by hot-water circulation. They are pronounced by the most experienced experts in the country as having more power, size for size, and being far in advance of any hot-water heater hitherto made.

First, they present two and one-half times more surface to the direct action of the fire than any boiler made, size for size. This surface is designated and parties can intelligently ascertain the amount of capacity each boiler has.

Second, the construction of the heater is such that each particle of the water is compelled to pass around and over the fire seven different times in its natural course through each section alternately, one after another,



thus becoming hotter and hotter before reaching the mains, a result not heretofore accomplished; consequently the upper sections of our boiler are the hottest, showing by actual fact that instead of the lower sections doing all the work, each and every section is doing its share, and the water is raised in temperature on its way upward to the mains. No other boiler is made producing this same important result, as the majority of boilers are constructed so that the water virtually passes only once over the fire and then into the direct water columns, thus passing off to the mains. Whereas in the "Perfect" Boilers the water in the lower section has to pass to the next section above, and then through the third section, and so on up to the mains. The result is great power with an economical use of fuel.

Third, with the "Perfect" Heaters the formation of steam and the stoppage of circulation is an utter impossibility, as their construction compels the water to flow in a natural manner through each of the water sections, which are each exposed to the fire, giving a quick, positive circulation which is unprecedented, and compelling the water, when leaving the boiler, to leave it hot. The great difficulty heretofore in ordinary Hot-Water Boilers has been their slow, sluggish circulation. The "Perfect" Boilers work to the contrary. The circulation is rapid and discharges the heat effectually, and universally give the best of satisfaction.

Fourth, the enormous fire-surface which each section exposes to the direct action of the fire, produces great heating results. Eighty-five per cent of the square feet of boiler surface is direct fire-surface, and fifteen per cent is flue-surface, which gives us two and one-half times more fire-surface than any boiler yet constructed, size for size.

These boilers have been used, giving excellent satisfaction, as will be seen by the testimonials which will be sent at request and we respectfully call attention to these popular "Perfect" Heaters of all who are desirous of obtaining a powerful Hot-Water Boiler for heating purposes.

By sending us a rough sketch of the first and second stories of a house, giving size and height of rooms and halls, designating those which are to be heated, and marking which way is north, we can intelligently advise as to the proper size required to heat the house in cold weather; and give also any other information relative to piping radiators, etc.

These heaters are adapted for burning hard or soft coal, or natural-gas. Owing to their construction any of the above fuels can be used with equal success.

RICHARDSON & BOYNTON CO.,
232 & 234 WATER STREET, NEW YORK, N. Y.

METAL INTERESTS.

THE rapid progress made in artistic metal goods during the past ten years can only be appreciated by a visit to the show-rooms of the large manufacturers. Specially prominent can be mentioned the industry of gas and electric fixtures. A visit to the spacious show-rooms of the Archer & Pancoast Manufacturing Company, whose principal ware-rooms are at 900 Broadway, New York, with branch stores at 270 and 272 Wabash Avenue, Chicago, and 12 West Street, Boston, will disclose pretty much everything that inventive genius and mechanical skill have been able to produce in the way of artistic illuminating apparatus, while the assortment of fine metal-work is unsurpassed in any city in the world. Here an observer will note that every detail of the architect and interior decorator has been followed, so that harmony may reign supreme when the house is finished.

The illuminating fixtures of to-day are designed with a view of furnishing interiors, be they for gas, electric-light or both combined; these fixtures are made of bronze, and finished in many different colors to suit each particular case. Cast-iron is wrought into many curious shapes for illuminating fixtures, its most expensive treatment, being polished.

The magnitude of the above-mentioned company can only be realized by a tour through their factory at Thirty-third Street and First Avenue, New York, where are employed one thousand skilled workmen, under the experienced supervision of Mr. Chas. H. Fischer.

ARCHER & PANCOAST MFG. CO.,
896-900 BROADWAY, NEW YORK, N. Y.

THE well-known maker of pumping machinery, Henry R. Worthington, has just opened a branch office at 338 Sibley Street, St. Paul, Minn. This is an addition to offices at New York, Boston, Philadelphia, Chicago, St. Louis and San Francisco.

NOTES.

The Whittier Machine Company have recently constructed for Messrs. F. W. Bird & Son, of East Walpole, Mass., two horizontal steel-boilers, each six feet in diameter.

Mr. John Williams, who is one of the most earnest promoters of the modern revival of artistic wrought metal-work, has removed his establishment to 544–556 West Twenty-seventh Street, New York, N. Y.

Mr. George Westinghouse is having his summer residence at Lenox, Mass., plastered with King's Windsor Cement. Mr. H. Dodge of Pittsfield, the contractor, reports that he never saw finer plastering.

On May 1, 1889, the firm of C. A. Blessing & Co., of New York, was dissolved by mutual consent. The business in plumbing goods of the above firm will be continued by George A. Blessing and Henry Stein, Jr., at 52 Cliff St., under the name George A. Blessing & Co.

Dr. Meredith's new church in Brooklyn, one of the largest churches in that city, is plastered with King's Windsor Cement, and is worthy the attention of architects and builders.

The N. Y. C. & H. R. R. R., have given King's Windsor Cement for plastering walls and ceilings, a severe test, with the result of which they were so well pleased, that John D. Fouquet, the head architect has given J. B. King & Co., a very strong letter recommending it to all who want first-class plastering.

The new station of the New York and Northern R. R. at Yonkers, N. Y., has just been plastered with King's Windsor Cement, and is worthy of the attention of all in that vicinity who contemplate building. Mr. George Edward Harding, 40 Exchange Place, New York, Architect, and Mr. Terry, Contractor.

We have had the pleasure of viewing an exhibition of Mr. Wm. Scott Morton's Tynecastle Modelled Canvas, in a private room of Messrs. W. & J. Sloane's premises in New York, and are glad to be informed that the Tynecastle Company intends in the fall to open an office in that city where a permanent display of that highly artistic material will always be on view for the convenience of architects and decorators.

It may interest engineers and architects to know that Twenty-four Inch Steel Beams are now made in America.

The announcement is made that we have successfully rolled this size.

We inform our friends and customers that we have a stock of Twenty-four Inch Steel Beams on hand.

The lightest section weighs 80, the heaviest 100 pounds per foot.

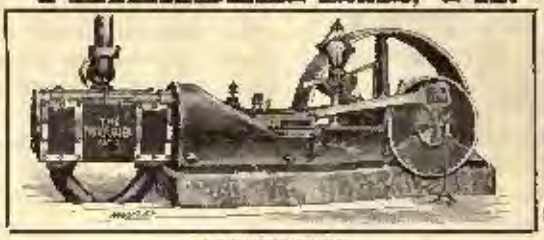
Correspondence solicited.

CARNEGIE, PHIPPS & CO., LIMITED.

Messrs W. D. Allen & Company, Chicago, who represent the New York Belting and Packing Company, New York, in that city, have just issued a new and attractive catalogue, containing full description of their large line of vulcanized rubber goods. The cover, which is of a good quality of paper, is of a buff tint, and printed in red and bronze; a view of the Company's warehouse and sales-rooms, 151 Lake Street, being shown on the back. It is a pamphlet of forty pages, profusely illustrated, typographically correct in every particular, and great care and much labor has evidently been bestowed in its preparation and production. Its perusal cannot fail to be of benefit to those interested in the line of goods which Messrs. W. D. Allen & Company handle.

Southwark Foundry and Machine Company,
PHILADELPHIA, PA.

BOILERS. TANKS. STEAM HAMMERS. HEAVY CASTINGS.



BLOWING AND REVERSING ENGINES. CENTRIFUGAL PUMPS. STEAM PUMPS.

SOLE MAKERS OF
Porter-Allen Automatic Engine.
HIGH ECONOMY. DURABILITY. CLOSE REGULATION.

THE BEST IS THE CHEAPEST IN THE END

This especially applies to a roof and what it is Covered with.

"OLNEY" TERNEPLATES

Have the heaviest coating possible, retaining all the Metal the sheet will hold.

FOR SALE ONLY BY
WM. Q. WALES,
Dealer in Tinplates, Sheet Irons, Sheet Zinc, etc.
26 Oliver Street, BOSTON, MASS.

TO ARCHITECTS AND CONTRACTORS:

We desire to call your attention to the Superior quality of Plate Glass manufactured by the
PITTSBURGH PLATE GLASS CO.

The Largest Plates of Glass in buildings in the cities of Chicago, Cleveland, Detroit, St. Paul, Syracuse, Pittsburgh, Philadelphia, Baltimore, and many New York buildings, were manufactured by our Company.

The only fuel used throughout both our works is **Natural Gas**; which, owing to its superior heating power and cleanliness, enables us to produce an article which **cannot be surpassed**, besides glass melted and annealed by our process with this gas, is far more durable and not so liable to break.

We make a specialty of three-sixteenths thickness for fine residences, also extra large sizes, wide and long plates for store fronts, beveled and obscured plates, skylight and floor glass.

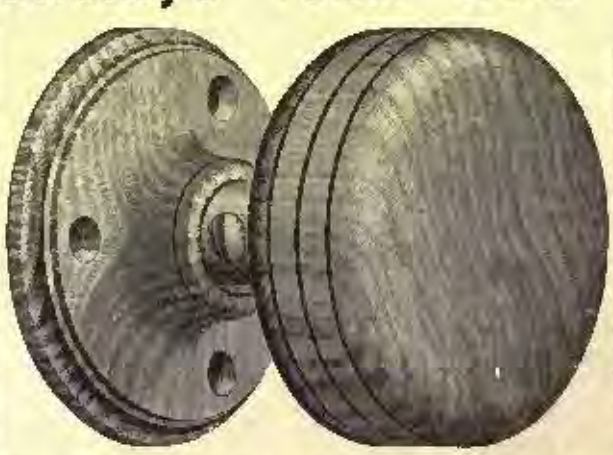
With a capacity of 260,000 square feet monthly, we are prepared to execute all orders promptly, and invite correspondence.

WORKS No. 1, CREIGHTON, PA.
WORKS No. 2, TARENTUM, PA.

Western Union Wire and Telephone connection in General Office at Creighton, Pa.

E. L. FORD, Sec.

Bardsley's Patent Wood Door Knobs.



The most desirable medium priced KNOBS in the market. Handsome in appearance, beautifully and durably finished, and pleasant to the hand. Every Knob warranted not to come loose or give out in any way. Besides the regular woods which we carry in stock, we make them to match special trim in such woods as Sycamore, Hazel, Birch, Whitewood, Yellow Pine, etc.

The engraving represents No. 116 Knob, list price, $6.50 per dozen pairs. We also have Door Stops and Shutter Knobs, hand-turned and polished to match the Door Knobs, which cost but little more than the common goods.

Price List on application.

J. BARDSLEY, 59 Elm St, New York,
—AND—
The Yale & Towne M'f'g Co., {NEW YORK, BOSTON, PHILADELPHIA AND CHICAGO.

A. G. NEWMAN, late NEWMAN & CAPRON.
MANUFACTURERS OF
Fine Bronze Hardware, Bank, Office and Stoop Railings in Bronze or Brass. Antique Furniture-Trimmings. Electrical and Mechanical Bell-Hanging Burglar-Alarms.
Warerooms, 1180 BROADWAY. Factory, 157-163 WEST 29th STREET, NEW YORK, N. Y.

DYCKERHOFF
PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength that it will permit the addition of 25 per cent more sand, etc., than other well-known brands, and produce the most durable work. It is therefore the most economical to use. 8,000 barrels have been used in the foundations of the Statue of Liberty. Architects and those interested in Portland Cement will please send for my pamphlet, which will be mailed free on application. It contains valuable directions for the employment of Portland Cement, a table of results of the strength of the Dyckerhoff Cement when mixed with sand and broken stone in various proportions, together with tests and testimonials of eminent Engineers, Architects and Consumers.

E. THIELE, 78 William St., New York.
SOLE AGENT FOR THE UNITED STATES.

INVALUABLE TO ARCHITECTS.

Safe Building.

BY LOUIS De COPPET BERG.

Series I. Square 8vo. Illustrated with numerous formulæ, diagrams and tables. . $5.00

"The author proposes to furnish to any earnest student the opportunity to acquire, so far as books will teach, the knowledge necessary to erect *safely* any building. First comes an introductory chapter on the Strength of Materials. This chapter gives the value of, and explains briefly, the different terms used, such as stress, strain, factor-of-safety, centre of gravity, neutral axis, moment of inertia, etc. There follows a series of chapters, each dealing with some part of a building, giving practical advice and numerous calculations of strength; for instance, chapters on foundations, walls and piers, columns, beams, roof and other trusses, spires, masonry, girders, inverted and floor-arches, sidewalks, stairs, chimneys, etc."

These papers are the work of a practising architect, and not of a mere bookmaker or theorist. Mr. Berg, aiming to make his work of the greatest value to the largest number, has confined himself to his mathematical demonstrations to the use of arithmetic, algebra, and plane geometry. In short these papers are in the highest sense practical and valuable.

TICKNOR AND COMPANY, Boston.

Electrical House Furnishings.
HAZAZER & STANLEY,
32 & 34 Frankfort Street,
NEW YORK.

COMPAGNIE GÉNÉRALE DES ASPHALTES DE FRANCE, Ltd
Sole Proprietors of the Mines of Seyssel.

SEYSSEL

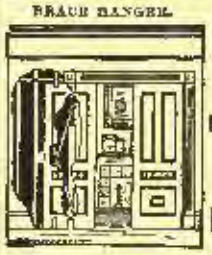
E. H. WOGTTON, 35 Broadway, N.Y.
General Agent for the United States and Canada, and Importer of Bitumen Damp-Course.

THE
FRED J. MEYERS M'F'G. CO.
COVINGTON, KY.
M'F'GRS OF
ARCHITECTURAL
CAST & WROUGHT
IRON WORK
FENCING · CRESTING · BRASS & WIRE COUNTER RAILINGS
BRASS IRON & STEEL
WIRE · CLOTH · AND · WIRE · GOODS OF EVERY DESCRIPTION
SEND FOR CATALOGUE PRICES

STAR ENCAUSTIC TILE COMPANY, (Limited),
Manufacturers of Superior Gas-Burned Plain and Encaustic **FLOORING TILE**, for Hearths and Floors in Banks, Hotels, Depots, etc. Natural Gas the only Fuel Used.
Office & Factory, PITTSBURGH, PA.

Prescott's Door-Hanger.

BRACE HANGER.

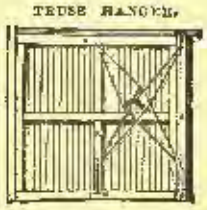


TRUSS HANGERS
For Barns, Warehouses, Freight Stations, etc.

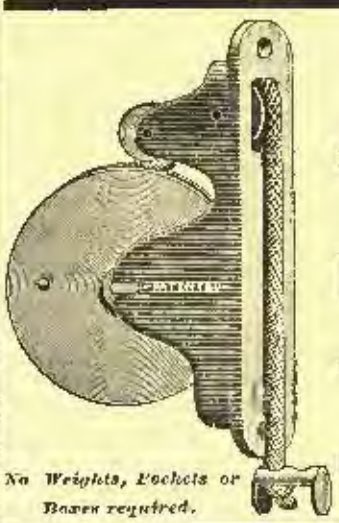
BRACE HANGERS, concealed from view, for PARLOR DOORS.

No Rolls or Track. Hangers for Elevator Doors a Specialty. Send for Circular.

TRUSS HANGER.



PRESCOTT HARDWARE MANUFACTURING CO.
108-110 Randolph St., Chicago, Ill.



BEST
—AND—
CHEAPEST
Means for Hanging Window Sash.

The ROCHESTER SASH BALANCE
Works better than Weights.

Heft of the Sash automatically Regulates the lifting power of the Balance.

Sample sent free to all Architects on application.

No Weights, Pockets or Boxes required.

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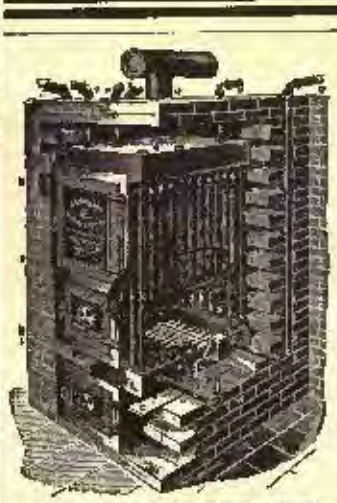

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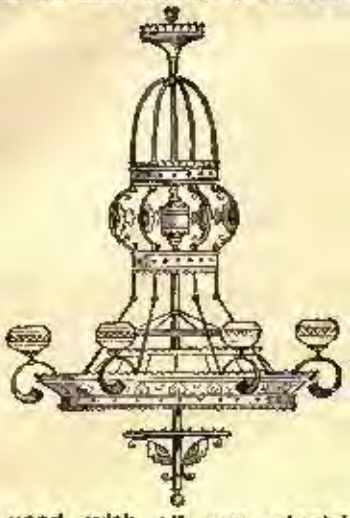

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Fifth Ave. Auction Rooms, 240 Fifth Ave., New York.
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Christ Episcopal, Jordan, N. Y.
First Congregational, Williamstown, Mass.
First Baptist, Franklin, Ind.
Euclid Ave. Congregational, Cleveland, O.
Second Congregational, New London, Conn.
Twenty-Second St. Baptist, Louisville, Ky.
Methodist Episcopal, Chatham, N. Y.
Universalist, Titusville, Pa.
Presbyterian, Greenwich, Conn.
St. Stephen's, Worcester, Mass.
Trumbull Ave. Presbyterian, Detroit, Mich.
Methodist Episcopal, Hendington, N. J.
Jane St. M. E., New York.
First Unitarian, Deerfield, Mass.
St. Rose, Lima, N. Y.
St. John's M. E., Brooklyn, N. Y.
Methodist Episcopal, San Bernardino, Cal.
First Baptist, Columbus, Miss.
Methodist Episcopal, Ontario, Cal.
Church of the Ascension, Hamilton, Ont.
Madison Ave. Reformed, New York.
Centenary M. E., Newark, N. J.
Greenwood Baptist, Brooklyn, N. Y.
Seventh Day Baptist, Plainfield, N. J.
Zion, Greene, N. Y.
West Side Ave. Presbyterian, Jersey City, N. J.
English Lutheran, Hazleton, Pa.
Brick Church, Presbyterian, Orange, N. J.
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First Baptist, Johnstown, Pa.
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Methodist Episcopal, Hackettstown, N. J.
Trinity Church, Portland, Conn.
Dwight Place Church, New Haven, Conn.
First Presbyterian, Galveston, Tex.
Classon Ave. Presbyterian, Brooklyn, N. Y.
Tunkins Ave. Congregational, Brooklyn, N. Y.
Baptist, Beverly, Mass.
Asbury Memorial M. E. Church, Providence, R. I.
St. Bernard's, Raritan, N. J.
Cumberland Presbyterian, Murfreesboro, Tenn.
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Garland St. M. E. Church, Flint, Mich.
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Lutheran Church, Wooster, O.
Centenary M. E. Church, Jacksonville, Ill.
Pilot St. Congregational, Newton, Mass.
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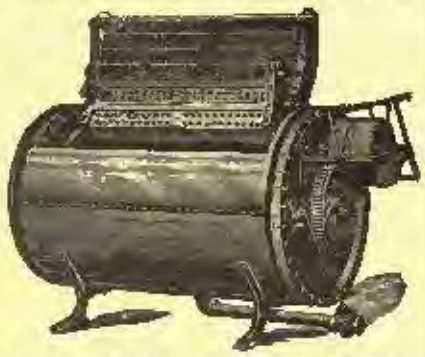

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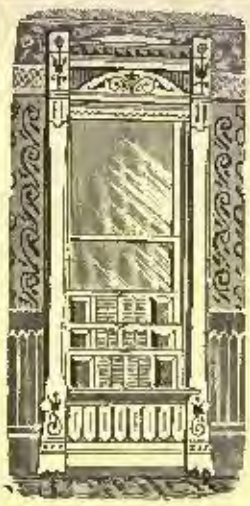

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